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Docket 83245LMB  
Customer No. 01333

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of

Charles E. Romano Jr.

INK RECORDING ELEMENT

Serial No. 10/068,824

Filed February 06, 2002

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*Christine Tolhurst*  
Christine Tolhurst

*October 11, 2005*  
Date

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Commissioner for Patents

P.O. Box 1450

Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF TRANSMITTAL**

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

Respectfully submitted,

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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

**BEST AVAILABLE COPY**





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Mail Stop APPEAL BRIEF-PATENTS  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

Sir:

**APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134**

10/14/2005 EFLDRES 00000046 050225 10068824

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## **APPELLANT'S BRIEF ON APPEAL**

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1-22, 37 and 38 which was contained in the Office Action mailed 05/11/2005.

A timely Notice of Appeal was filed 08/08/2005.

### **Real Party In Interest**

As indicated above in the caption of the Brief, the Eastman Kodak Company is the real party in interest.

### **Related Appeals And Interferences**

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

### **Status Of The Claims**

Claims 1, 3-36, and 38 are pending in the application.

Claims 23 – 36 stand withdrawn from consideration as directed to a non-elected invention, pursuant to a restriction requirement made by the Examiner in an Office Action dated 10/30/2003, and the Applicant's election made in the Response dated 1/30/2004.

Claims 2 and 37 have been canceled.

Claims 1, 3-22 and 38 are being appealed.

Appendix I provides a clean, double spaced copy of the claims on appeal.

### **Status Of Amendments**

An Amendment After Final was filed on July 11, 2005, subsequent to the Final Rejection. An Advisory Action dated July 27, 2005 was then received entering the proposed amendment but not allowing the claims.

### **Summary of Claimed Subject Matter**

The present subject matter relates to an ink recording element comprising a support having thereon a hydrophilic absorbing layer and a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising



acetoacetylated poly(vinyl alcohol). The invention is a multilayer structure which offers better laminate adhesion than the elements of the prior art. In accordance with the invention, it has been found that a specific combination of image receiving layers, each comprised of specific materials and arranged in a specific sequence on a support material, yields excellent ink imaging performance for a wide range of commercially available printing systems.

### **Grounds of Rejection to be Reviewed on Appeal**

The following issues are presented for review by the Board of Patent Appeals and Interferences:

1. Claim 38 stands rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.
2. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593).
3. Claims 1, 3, 9, 11, 12, 15, 21, and 22 are rejected under 35 U.S.C. 102(b) as being unpatentable over Kawano et al. (5,478,631).
4. Claims 1, 3, 7-15, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. (5,478,631).
5. Claims 1, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. and further in view of Tomizawa et al. (6,224,971).
6. Claims 1 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. and further in view of Ueda et al. (EP 791,475).
7. Claims 1, 7, 8, 21, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Niu et al. (6,599,593).
8. Claims 1, 9-14, 19-22, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al.
9. Claims 1, and 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593) and further in view of Tomizawa et al. (6,224,971).



10. Claims 1 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593) and further in view of Ueda et al. (EP 791,475).

### **Arguments**

#### **1. Rejection of Claim 38 under 35 USC § 112:**

The Examiner has rejected Claim 38 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, stating:

“Claim 38 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. With respect to claim 38, the examiner was unable to find support in the original claims or specification for the limitation that the vinyl latex polymer be anionic. Applicants have pointed to several claims and places within the specification, including the examples. There is one example that includes a vinyl latex by tradename, but fails to state or suggest a preference for anionic vinyl latex materials. Consequently, this claim limitation is new matter.”

The Applicants argue that the Examples, specification and information related to commercial product in the public domain provide support for the limitation that the vinyl latex polymer be anionic.

Example 4, pg. 17, line 26 of the application makes specific mention of an anionic latex, Morcryn 132 vinyl latex. Information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter. MPEP 2163.06. Review of Example 4 on pg. 17 of the specification indicates that the overcoat layer has a composition of a mixture of Z-210 acetoacetylated poly(vinyl alcohol) (Nippon Gohsei) and Mocryn ® 132 vinyl latex (Rohm and Haas) in a weight ratio of (75%/25%). Example 2 has a composition of a mixture of Z-210



acetoacetylated poly(vinyl alcohol) (Nippon Gohsei) and Witcobond ® UCX-244 polyurethane dispersion in a weight ratio of (75%/25%), specifically mentioned as the preferred anionic polyurethane on pg. 8, line 24 - pg. 9, line 2 of the specification.

The previously submitted Product Information sheet on Mocryl® 132 from Rohm & Haas, included in Appendix II, which would indicate to one of ordinary skill in the art that Mocryl® 132 is anionic. The anionic nature of Mocryl® is an inherent characteristic of the chemical compound bearing the tradename Mocryl®. This characteristic, resulting from the known chemical structure of the compound, would be obvious to one of ordinary skill in the chemical formulating art related to ink recording elements. According to MPEP2163.07(a) Inherent Function, Theory, or Advantage, by disclosing in a patent application a device that inherently performs a function or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. The application may later be amended to recite the function, theory or advantage without introducing prohibited new matter. In re Reynolds, 443 F.2d 384, 170 USPQ 94 (CCPA 1971); In re Smythe, 480 F. 2d 1376, 178 USPQ 279 (CCPA 1973).

The specification also clearly discloses anionic polyurethane dispersions (pg. 7, line 4, pg. 8, lines 24-28 and pg. 17, Examples 2, 3). The specification also discloses vinyl latex polymers (pg. 6, lines 3-5) and Example 4 specifically discloses an anionic vinyl latex polymer. It would be clear to one of ordinary skill in the art that, if anionic polyurethane dispersions are preferred, other anionic components, such as vinyl latex polymers, would be preferred. It would be clear to one of ordinary skill in the formulary arts from the exemplified formulations of the Examples, that anionic materials are necessary, in order to produce non-agglomerated, coatable materials. For example, Example 2 utilizes Witcobond® 244, describes as an anionic polyurethane in the specification (pg. 8, line 24 – pg. 9, line 2). The only difference between Example 2 and Example 4 is that Witcobond® 244, described as an anionic polyurethane, is replaced with



Morcryl ® 132. It would be obvious to one of ordinary formulary skill that Morcryl ® 132 would also be anionic.

According to MPEP 2164.05(a): The specification need not disclose what is well-known to those skilled in the art and preferably omits that which is well-known to those skilled and already available to the public. In re Buchner, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); Hybritech, Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987); and Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). In addition, "That what appellants claim as patentable to them is less than what they describe as their invention is not conclusive if their specification also reasonably describes that which they do claim. Inventions are constantly made which turn out not to be patentable, and applicants frequently discover during the course of prosecution that only a part of what they invented and originally claimed is patentable." In re Wertheim, 541 F.2d 257, 263 (CCPA, 1976). "Since the patent law provides for the amendment during prosecution of claims, as well as the specification supporting claims, 35 USC 132, it is clear that the reference to "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention" in the second paragraph of 35 USC 112 does not prohibit the applicant from changing what he "regards as his invention" (i.e., the subject matter on which he seeks patent protection) during the pendency of his application." Cf. In re Brower, 58 CCPA 724, [728] 433 F.2d 813, 817, 167 USPQ 684, 687 (1970). In the present application, the Examples clearly teach anionic polyurethane dispersions as well as anionic vinyl latex polymers. The Applicants therefore believe that Claim 38 does not introduce new matter.

## **2. Rejection Of Claim 38 Under 35 U.S.C. §103(a):**

The Examiner has rejected Claim 38 under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593), stating:

"Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. (5,478,631) for reasons of record and further in view of applicants' admission of pages 8-9 of the specification for



reasons given below. Applicants admit that polyurethane that may be used in their invention may be Witcobond ® W-232, a commercially available polyurethane dispersion. Based upon the disclosure of the reference that a polyurethane dispersion may be included in the disclosed medium, it would have been obvious to one of ordinary skill in the art to include a commercially available polyurethane that is capable of forming part of an aqueous coating composition.”

The Applicants argue that Niu is silent with respect to a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion in a multi-layer format, as claimed.

Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Niu fails to teach, disclose or suggest a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Niu



fails to teach or suggest the improvements in laminate adhesion achievable with the use of acetoacetylated poly(vinyl alcohol) in combination with an anionic vinyl latex polymer or an anionic polyurethane dispersion in the overcoat layer. Niu also fails to disclose the use of anionic materials, utilizing an amphoteric latex instead. Niu also fails to mention the property of laminate adhesion. Therefore, the reference fails to provide any motivation to modify the reference to produce the laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) in combination with an anionic vinyl latex polymer or an anionic polyurethane dispersion in the overcoat layer which provides better laminate adhesion as presently claimed. The reference also fails to provide any likelihood of obtaining improved laminate adhesion by using acetoacetylated poly(vinyl alcohol) in combination with an anionic vinyl latex polymer or an anionic polyurethane dispersion in the overcoat layer as presently claimed in an overcoat layer. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. In addition, Niu indicates that secondary binders other than derivatized PVA and polyurethane may be used. At least one of these other secondary binders, carboxycellulose, has been utilized as Control Example 4, over which the presently claimed composition demonstrates surprising laminate adhesion. At best, Niu provides a list of materials that would be obvious to try, some of which have been found to not provide laminate adhesion. Finally, since the reference fails to mention laminate adhesion or the use of acetoacetylated poly(vinyl alcohol) in combination with an anionic vinyl latex polymer or an anionic polyurethane dispersion in the overcoat layer in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed. For the reasons discussed above, the Applicants believe that the use of acetoacetylated poly(vinyl alcohol) in combination with an anionic vinyl latex polymer or an anionic polyurethane dispersion in the overcoat layer is non-obvious.

**3. Rejection of Claims 1, 3, 9, 11, 12, 15, 21, and 22 Under 35 U.S.C. §102(b):**



The Examiner has rejected Claims 1, 3, 9, 11, 12, 15, 21, and 22 are rejected under 35 U.S.C. 102(b) as described in the Office communication dated 9/28/2004, stating that:

“Kawano et al. disclose an ink jet recording element having a support and top and bottom hydrophilic absorbing layers on its surface. Both top and bottom layer are formed from an aqueous composition including amphoteric latex, water-soluble polymer and pigment (see col. 7, lines 3-21). As water-soluble polymers, the reference discloses one or more of a group including acetoacetylated polyvinyl alcohol, polyvinyl pyrrolidone, and gelatin. The layers may also contain vinyl latexes and polyurethane resin (see col. 6, lines 1-48). The reference discloses layer weight per area as opposed to layer thicknesses (see col. 9, lines 18-24). The bottom layer may be further divided to form an intermediate layer and a lowest layer (see col. 7, lines 52-55). The ink receptive layers may contain a dye-fixing agent, i.e. mordant (see col. 6, lines 48-61). It is noted that the term "lamine adhesion promoting absorbing hydrophilic overcoat polymer latex" has no specific meaning in the art and is largely a series of functions assigned to the layer. Since the top layer of the reference would have each of these properties to some degree, the claimed layer reads on the top layer of the reference.”

The Applicants have provided evidence which indicates that one of ordinary skill in the art would have understood that the terms “lamine adhesion” has a specific meaning which differs from the meaning of the term “adhesion”. The reference to Kawano fails to disclose the use of a lamine adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol).

Kawano relates to an ink jet recording sheet comprising a substrate and an ink receptive layer disposed on said substrate, said ink receptive layer containing a pigment and a binder as its main components, the improvement comprising said ink receptive layer being an aqueous composition containing a



pigment and an amphoteric latex as its main components, which absorbs water-base ink well, gives high-grade images, and ensures excellent water resistance of printed images. Kawano fails to disclose difficulties with laminate adhesion and fails to disclose the use of a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol).

The present invention comprises an ink recording element comprising a support having a hydrophilic absorbing layer and a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion than the elements of the prior art, while maintaining other properties such as excellent image quality, no banding, bleeding, coalescence, or cracking in inked areas, absorption of large amounts of ink, quick drying to avoid blocking, high optical densities in the printed areas, freedom from differential gloss and high levels of image fastness.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. The reference to Kawano fails to teach or suggest a laminate adhesion promoting overcoat layer. As a result, Kawano fails to anticipate the presently claimed invention.

The term "laminate adhesion" and the term "adhesion" have accepted and different meanings in the art. "Laminate adhesion" refers to the adhesion of a coating as part of a laminate. There are multiple aspects to laminate adhesion, as is illustrated by ASTM Test Method F2226-03, Section 4.6 and FIG.2 on pg. 2, provided in Appendix II. The term "laminate adhesion" includes the adhesion of each layer within the multi-layer laminate to an adjacent layer, the adhesion of the multiple layers to the support, and adhesion of all the laminate layers together. Laminate adhesion failure can occur between any two layers of the multi-layer structure, not just at the interface of a layer with the substrate or at the interface of a layer with a layer containing acetoacetylated poly(vinyl alcohol). The cited prior art contains a different term, that is, simple "adhesion", which refers to the adhesion between a layer and the adjacent substrate. Simple adhesion is understood by those of ordinary skill in the art to refer to the relationship



between the substrate and layer applied directly to the substrate. See ASTM Test Method D3359-02, especially the Appendix at X1.3.2., provided in Appendix II. The inventive element presently claimed has an adhesion promoting overcoat layer over inner layer(s). The use of this layer improves the adhesion of all the layers, both to adjacent layers and to the substrate. In "laminate adhesion" as presently used, the substrate is not in contact with the adhesion promoting overcoat layer. In the prior art, enhanced "adhesion" involves an adjacent layer. Therefore, the definitions of the terms "adhesion" and "laminate adhesion" are not synonymous and the reference cannot anticipate the present claims.

Further, the cited prior art indicates that the term "adhesion" is specific to the interaction between the substrate and the coated layer, as evidenced by Kawano, col. 1 line 65 – col. 2, line 2 ("If a synthetic paper or a plastic film is used as a substrate or a Latex is used as a binder, then the ink jet recording sheet will have the disadvantages that the adhesion between the ink receptive layer and the substrate is weak and ink is not dried or absorbed well."), Kawano, col. 4 lines 47-50 ("The amphoteric latex used in the present invention displays its characteristic features as in the following when a synthetic resin material having a strong barrier property such as a plastic film and a synthetic paper is used as a substrate: The ink receptive layer matches the substrate better, and as a result strong adhesion is obtained."), Kawano, col. 8 lines 9-12 ("Second, in said bottom layer, if the amount of the amphoteric latex is larger than the amount of the water-soluble high polymer, then the adhesion of the ink receptive layer to the substrate is increased."), Kawano, col. 8 lines 31-35 ("If the amount of the amphoteric latex is below 40 parts by weight or smaller than the amount of the water-soluble high polymer, then the adhesion of the ink receptive layer to the substrate is unfavorably lowered."), Kawano, col. 8, lines 44-48 ("In the bottom layer of the ink receptive layer, if the amount of the water-soluble high polymer is above 30 parts by weight per 100 parts by weight of pigment, then the adhesion of the ink receptive layer to the substrate is unfavorably lowered...").

The Examiner has indicated:

"Applicant's arguments filed March 2, 2005 have been fully considered but they are not persuasive. Applicants are continuing



to rely on the language "laminate adhesion promoting overcoat layer" as if it lends specific structure to the medium above and beyond an overcoat layer that promotes adhesion at some point (i.e. at any point) in the laminate. Applicant has submitted an ASTM Figure 2 showing modes of laminate failure. These modes include failure wherever it occurs in the laminate. Failure between the substrate and the next closest layer is labeled as a type of laminate failure, i.e. "Debonding from the substrate." Applicants' attempts to distinguish between laminate adhesion and adhesion are not well founded. Each point in the figure labeled as a point where debonding can occur is a point of adhesion and a point of laminate adhesion. These terms are synonymous as used in this context."

The ASTM test methods, included in Appendix II, have been provided as evidence of different meanings between the terms "laminate adhesion" and "adhesion" known to those of ordinary skill in the art at the time the application was filed. Use of the term "adhesion" is used in conjunction with an adjacent layer, be it another layer or the substrate. Use of the term "laminate adhesion" is used in a multi-layer context, and includes the entire structure – adjacent as well as non-adjacent layers in a multi-layer pack.

The Examiner indicates:

"Applicants argue that Kawano et al. is not directed to solving problems related to laminate adhesion. However, laminate adhesion is an aspect of all laminates. If the layers do not stay together, the medium is not useful. In addition, Kawano et al. does not have to be directed to applicants' problem in order to anticipate or obviate the claims. Applicants have not argued and do not argue that Kawano et al. does not disclose media that can meet all of the structural limitations of their claims. Arguing that the reference does not disclose "a laminate adhesion promoting overcoat layer," when this phrase has no special meaning in the art, is not persuasive."



The Applicant has provided evidence of special meaning. The references must be viewed without the benefit of impermissible hindsight. It is only in hindsight and with the teachings of Applicants invention that the Examiner has encountered the term "laminate adhesion" and derived a meaning therefrom which has then been applied to occurrences of the term "adhesion" in the prior art.

The Examiner indicates:

"Kawano et al. does disclose an overcoat layer that may contain the same material as recited by applicants for their overcoat layer and that will necessarily promote adhesion, at least in its internal structure and where it adheres to the adjacent layer. These are both points of laminate adhesion and therefore the layer inherently discloses laminate adhesion. Applicants are directed to page 2 of their response where they quoted the MPEP 2163.07(a). If a device inherently performs a function or has a property, the patent specification necessarily discloses that function or advantage. Consequently, Kawano et al. necessarily discloses a laminate adhesion promoting layer. "

Laminate adhesion is not an inherent property of Kawano. As previously discussed, materials of Kawano have been used in the present specification as control examples, which failed laminate adhesion testing.

The Examiner states that:

"On page 5 of the response, applicants make many arguments that are unsupported by the record, i.e. that adhesion refers only to the adhesion between a substrate and an adjacent layer, that an adhesion promoting overcoat layer improves adhesion of all the layers, and that terms laminate adhesion and adhesion necessarily are referring to different things."

These statements made by the Applicants have, in every case, been referenced to either evidence provided or references cited by the Examiner, all of which are of record.

The Examiner indicates:



“Additionally, contrary to applicants' position, the cited art does not indicate that the term adhesion is specific to the interaction between the substrate and the coated layer. It is only so limited when followed by the language "between the ink receptive layer and the substrate" as in the passage of Kawano et al. cited by applicants. If adhesion always referred to adhesion at this location, then the location of the adhesion would never have to be recited.”

Applicants believe that the evidence included in Appendix II indicates that one of ordinary skill in the art would have known that the term “adhesion” referred to immediately adjacent layers, typically the substrate. One does not have a duty to teach what is known to those of ordinary skill in the art. However, Ueda, pg. 27, paragraph [0090] (“The layer provided on one or each side of the support may contain a matting agent in an amount of 0.005 to 0.1 g/m<sup>2</sup> in order to minimize adhesion failure such as blocking.”), and Tomizawa, col. 4 lines 23-29 (“If desired in order to improve the adhesion between the substrate surface and the ink-receptive layer thereon, it is optional to subject the substrate surface to a treatment having a priming effect such as a corona discharge treatment, ozone treatment and plasma treatment as well as to a coating treatment to form an undercoating layer of a saturated polyester resin or urethane resin having a thickness in the range, for example, from 0.5 to 5  $\mu$ m.”) also illustrate that those of skill in the art know of the usage of “adhesion” in connection with adjacent layers.

The Examiner continues that:

“Since the term adhesion is broad and refers to adhesion anywhere in the laminate, the references state the location they are referring to. Applicants have cited numerous passages all supporting the examiner's position on page 6 of the response. “

Applicants position, restated, is that those of ordinary skill in the art would recognize that adhesion relates to a property between adjacent layers. The property of laminate adhesion extends beyond adjacent layers to include improvements in the connection with non-adjacent layers, for example, a laminate adhesion improving topcoat which produces enhanced adhesion between an inner layer and the substrate.



The Examiner later indicates that:

“Next, applicants attempt to rely upon their examples to overcome the reference.” This is not relevant to the rejection under 35 USC 102.”

This evidence is allowable to disprove inherency under 35 U.S.C. 102. MPEP Section 2112 indicates that “[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on ‘inherency’ under 35 U.S.C. 102, on ‘prima facie obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. In *re* Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re* Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)). MPEP Section 2113 indicates “Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In *re* Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983)”

**4. Rejection Of Claims 1, 3, 7-15, and 19-22 Under 35 U.S.C. §103(a):**

Claims 1, 3, 7-15, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. (5,478,631), indicating:

“Kawano et al. disclose an ink jet recording element having a support and top and bottom hydrophilic absorbing layers on its surface. Both top and bottom layer is formed from an aqueous composition including amphoteric latex, water-soluble polymer and pigment (see col. 7, lines 3-21). As water-soluble polymers, the reference discloses one or more of a group including acetoacetylated polyvinyl alcohol, polyvinyl pyrrolidone, and gelatin. The layers may also contain vinyl latexes and polyurethane resin (see col. 6, lines 1-48). The reference discloses layer weight per area as opposed to layer thicknesses (see col. 9, lines 18-24).



The bottom layer may be further divided to form an intermediate layer and a lowest layer (see col. 7, lines 52-55). The ink-receptive layers may contain a dye-fixing agent, i.e. mordant (see col. 6, lines 48-61). Since the reference states that the group of binders including polyurethane may be used "as far as the effects of the present invention are not lost," it would have been obvious to one of ordinary skill in the art to use less of these binders than of the water soluble high polymer, a required component in each layer (see col. 6, lines 33-36). Consequently, the ratio of polyurethane to polyvinyl alcohol instantly claimed would have been obvious to one of ordinary skill in the art. It also would have been obvious to one of ordinary skill in the art to determine thicknesses of the layers based upon the coating weights disclosed by the reference and the performance of the medium in areas of surface strength, bleeding and thinning, color reproduction, and water resistance, i.e. properties identified by Kawano."

Kawano relates to an ink jet recording sheet comprising a substrate and an ink receptive layer disposed on said substrate, said ink receptive layer containing a pigment and a binder as its main components, the improvement comprising said ink receptive layer being an aqueous composition containing a pigment and an amphoteric latex as its main components, which absorbs water-base ink well, gives high-grade images, and ensures excellent water resistance of printed images. Kawano fails to disclose difficulties with laminate adhesion and fails to disclose the use of a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol).

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Kawano fails to teach, disclose or suggest a laminate adhesion promoting overcoat layer containing



acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Kawano fails to disclose differences with adhesion which relate to material selection and fails to disclose the laminate adhesion achievable by selecting acetoacetylated poly(vinyl alcohol) for use in the overcoat layer. Kawano also fails to mention the property of laminate adhesion. Therefore, the reference fails to provide any motivation to modify the reference to produce the laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion as presently claimed. The reference also fails to provide any likelihood of obtaining improved laminate adhesion by using an acetoacetylated poly(vinyl alcohol) as presently claimed in an overcoat layer. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. Finally, since the reference fails to mention laminate adhesion or the use of derivatized poly (vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

Even assuming a prima facie case of obviousness has been made, the present invention provides surprising results. Kawano teaches the use of poly(vinyl alcohol) (col. 6, lines 1-15) which cannot be used alone, but must be utilized with an amphoteric latex (col. 6, lines 26-33). Kawano also indicates in col. 4, lines 51-58, that PVA and modified PVA, when used alone as binders, provide inferior surface strength and water resistance. The present invention, Example 1, which has an overcoat containing derivatized PVA demonstrates excellent laminate adhesion (Table 2, page 18) as compared to Example 5, having an overcoat layer containing non-derivatized PVA, as well as Example 6, having an overcoat containing PVA and polyethyleneoxide copolymer.

The Examiner has indicated concern with the Examples, indicating that the examples do not vary only the polyvinyl alcohol, as, in each of examples 1-4, the derivatized polyvinyl alcohol is used along with another material (surfactants in example 1, polyurethane dispersion in examples 2 and 3, and vinyl copolymer in example 4). These materials were not present in the comparative examples, so there is no comparison in which the polyvinyl alcohol alone was



varied. However, Examples 1 and Control Example 5 are identical, except for the variation in poly(vinyl alcohol), derivatized vs. non-derivatized.

Example 1, as copied from the as-filed specification states:

“A polyethylene resin coated paper was treated by corona discharge and coated by means of an extrusion/slide hopper with a 10% gelatin solution in water, (succinylated pigskin gelatin, Kind & Knox Gelatine Co.), and 0.6% 12 micron polystyrene beads, dry coverage of about 8.5 microns and an inner layer of 5% solution of Elvanol ® 52-22 poly(vinyl alcohol) (DuPont) and a 30% dispersion of Witcobond ® 232 polyurethane ( Witco Corp), where the poly(vinyl alcohol) (PVA) and polyurethane dispersion (PUD) were mixed in a 77:23 ratio by weight at a dry coverage of 1.5 microns. An overcoat layer consisting of a 2% solution of Z-320 acetoacetylated poly(vinyl alcohol) (Nippon Gohsei) and APG 325N (Cognis) and Surfactant 10G (Arch Chemical) surfactants in a ratio by weight of 96.9/2.4/0.7 was coated over the gelatin and poly(vinyl alcohol)/polyurethane layers at a dry coverage of 1 micron. The coatings were dried thoroughly by forced air heat after application of the coating solutions.”

Control Example 1, copied from the as-filed specification states:

As in example 1 except that the overcoat layer consisted of hydroxyethyl cellulose (HEC QP 300, Dow).

Using the exact terms of Example 1, Control Example 1 would appear as follows:

“A polyethylene resin coated paper was treated by corona discharge and coated by means of an extrusion/slide hopper with a 10% gelatin solution in water, (succinylated pigskin gelatin, Kind & Knox Gelatine Co.), and 0.6% 12 micron polystyrene beads, dry coverage of about 8.5 microns and an inner layer of 5% solution of Elvanol ® 52-22 poly(vinyl alcohol) (DuPont) and a 30% dispersion of Witcobond ® 232 polyurethane ( Witco Corp), where the poly(vinyl alcohol).(PVA) and polyurethane dispersion (PUD) were mixed in a 77:23 ratio by weight at a dry coverage of 1.5 microns. An overcoat layer consisting of a 2% solution of hydroxyethyl cellulose (HEC QP 300, Dow) and APG 325N



(Cognis) and Surfactant 10G (Arch Chemical) surfactants in a ratio by weight of 96.9/2.4/0.7 was coated over the gelatin and poly(vinyl alcohol)/polyurethane layers at a dry coverage of 1 micron. The coatings were dried thoroughly by forced air heat after application of the coating solutions.”

Control Example 5, copied from the as-filed specification states:

As in control example 1 except that the overcoat layer consisted of a non-acetoacetylated poly(vinyl alcohol) (GH-23, Nippon Gohsei).

Using the exact terms of Example 1 and Control Example 1, Example 5 would appear as follows:

“A polyethylene resin coated paper was treated by corona discharge and coated by means of an extrusion/slide hopper with a 10% gelatin solution in water, (succinylated pigskin gelatin, Kind & Knox Gelatine Co.), and 0.6% 12 micron polystyrene beads, dry coverage of about 8.5 microns and an inner layer of 5% solution of Elvanol ® 52-22 poly(vinyl alcohol) (DuPont) and a 30% dispersion of Witcobond ® 232 polyurethane ( Witco Corp), where the poly(vinyl alcohol) (PVA) and polyurethane dispersion (PUD) were mixed in a 77:23 ratio by weight at a dry coverage of 1.5 microns. An overcoat layer consisting of a 2% solution of As in control example 1 except that the overcoat layer consisted of a non-acetoacetylated poly(vinyl alcohol) (GH-23, Nippon Gohsei) and APG 325N (Cognis) and Surfactant 10G (Arch Chemical) surfactants in a ratio by weight of 96.9/2.4/0.7 was coated over the gelatin and poly(vinyl alcohol)/polyurethane layers at a dry coverage of 1 micron. The coatings were dried thoroughly by forced air heat after application of the coating solutions.”

The Declaration of Romano, included in Appendix II, indicates in paragraphs 4-7 that, in fact, the examples do include a showing that unexpected results are obtained merely by changing from non-derivatized to derivatized polyvinyl alcohol, as the coating aids (surfactants) were present in the comparative examples as well. Copies of the original laboratory notebook pages are included in Appendix II as C-1 (Layer / Melt Compositions), Attachment C-2



(Coating Compositions – Inventive), Attachment C-3 (Coating Compositions – Control) and Attachment C-4 (Physical Evaluation). In addition, the inventor has duplicated the experimental work, including a set of examples which do not include surfactant. This data is included as Attachment D-1 (Data / Results), Attachment D-2 (Layer / Melt Compositions) and Attachment D-3 (Coating Compositions) and indicates that the peel force needed for Inventive Examples 1 and 5 is significantly greater than the peel force for Control Examples 5 and 11, indicating greatly improved laminate adhesion of the inventive sample over the control. In addition, Examples 5-8 and Control Examples 7-12 illustrate that the surfactants utilized in the overcoat layer do not affect laminate adhesion, only coatability of the laminate.

The Examiner indicates that, while Kawano et al. does not refer to any layer in this manner, the term "laminate adhesion promoting absorbing hydrophilic" is merely a list of properties that are attributed to the overcoat layer in the instant claims and the top layer of Kawano et al. will possess these properties to some degree because the layers adhere in a laminate, are hydrophilic, are made of polymers and provide an overcoat. However, it should be noted that Comparative Example 6 on pg. 17 of the present specification has poor laminate adhesion (see Table 2, pg. 19). Comparative Example 6 contains a poly(vinyl alcohol)/poly(ethylene oxide copolymer) (WO-320, Nippon Gohsei), included under the disclosure in Kawano col. 4, line 53, col. 6, lines 4-5. Therefore, improved laminate adhesion, is not a property any layer has if it is successfully laminated to adjacent layers and is not a property which the uppermost layer of Kawano et al. clearly possesses. In addition, since Kawano fails to mention any differences in adhesion that may be expected from the use of the list of materials disclosed therein, it is not at all clear that the recitation of Kawano at col. 8 indicates that laminate adhesion was a property that they were aware of and used to determine composition of their layers. As discussed above, laminate adhesion relates to more than just the overcoat layer itself. The overcoat layer promotes the adhesion to the adjacent layer, but applies to enhancing the adhesion of all the layers in the laminate – to each adjacent layer, to non-adjacent layers, as well as the whole laminate to the substrate. Kawano makes no disclosure that would lead



one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the adhesion of the whole structure.

The Examiner indicates that:

“Kawano et al. considered numerous properties in determining compositions of their layers, one of which was successful adhesion to adjacent layers (see col. 8, lines 9-13 and 44-51). The recitation at col. 8 identifies adhesion of the layers as a property that Kawano et al. had identified and were aware of. Therefore, they would have chosen the composition of each layer so that adhesion to adjacent layers was successful. It is unnecessary to modify the reference to produce laminate adhesion.”

Kawano makes no disclosure indicating that a layer, not in contact with the substrate, can improve the adhesion of a layer adjacent to the substrate to the substrate itself. Therefore, Kawano fails to teach laminate adhesion.

**5. Rejection Of Claims 1, and 4-6 Under 35 U.S.C. §103(a):**

The Examiner indicates:

“Claims 1, 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. as applied to claims 1-3, 7-15 and 19-22 above, and further in view of Tomizawa et al. (6,224,971).

The secondary reference discloses an ink jet recording sheet including acetoacetylated polyvinyl alcohol. The primary reference does not disclose the properties of the disclosed acetoacetylated polyvinyl alcohol used therein, therefore, it is appropriate to look elsewhere in the same art area for a particular acetoacetylated polyvinyl alcohol to use in the invention of the primary reference. Tomizawa et al. disclose an acetoacetylated polyvinyl alcohol with properties as recited by the instant claims (see col. 2, lines 46-67) although the reference is silent with respect to molecular weight. Both applicant and the secondary reference use a commercially available product from the Gohsefimer Z200 series of Nippon Gohsei Kagaku Kogyo Co. The examiner was unable to determine the molecular weights of each of these polymers. However, they



are in the same commercial series of the same company, and have the same degree of saponification and substitution. Therefore, it would have been obvious to one of ordinary skill in the art to determine the particular polyvinyl alcohol from the commercially available series of polymers identified by the prior art as useful in ink jet recording media applications in order to achieve the goals set forth by the primary reference.”

Tomizawa discloses novel ink-jet recording sheets having high water resistance, excellent transparency of the ink-receptive layer, ink absorptivity and color developability as well as the advantages of absence of surface tackiness and blocking and a liquid coating composition for forming the ink-receptive coating layer of the recording sheet. The liquid coating composition comprises, as a uniform blend in an aqueous medium, an acetoacetylated polyvinyl alcohol, a polyvinylpyrrolidone resin, and an acidic aqueous dispersion of a colloidal silica, each in a specified weight proportion. Tomizawa fails to disclose laminate adhesion or the use of a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol). Tomizawa deals with a single coated layer on a substrate, which would suffer from adhesion failure, but not laminate adhesion failure due to the absence of a multiple layer laminate.

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Kawano and Tomizawa fail to teach, disclose or suggest a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Tomizawa and Kawano also fail to mention the property of laminate adhesion. In fact, Tomizawa fails to disclose a laminate structure, disclosing instead a single coated layer on a substrate. Therefore, the references fail to provide any motivation to modify the reference to produce the laminate adhesion promoting absorbing hydrophilic



overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) over an inner layer to provide laminate adhesion as presently claimed. The Examiner notes that it would have been obvious to one of ordinary skill in the art to determine the particular polyvinyl alcohol, specifically acetoacetylated poly(vinyl alcohol), from the commercially available series of polymers identified by the prior art as useful in ink jet recording media applications in order to achieve the goals set forth by the primary reference. However, Kawano fails to teach the goal of improved laminate adhesion. The references also fail to provide any likelihood of obtaining improved laminate adhesion by using a derivatized poly (vinyl alcohol) as presently claimed. Finally, since the references fail to mention laminate adhesion or the use of acetoacetylated poly(vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

Also, as discussed above, the present invention provides evidence of surprising results. As discussed above, laminate adhesion relates to more than just the overcoat layer itself. The overcoat layer promotes the adhesion to the adjacent layer, but applies to enhancing the adhesion of all the layers in the laminate – to each adjacent layer, to non-adjacent layers, as well as the whole laminate to the substrate. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. Kawano makes no disclosure that would lead one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the adhesion of the whole structure and Tomizawa deals with only a single layer.

In summary, the references fail to suggest or motivate one to modify or combine the references, fail to provide a reasonable expectation of success, fail to teach or suggest all the claim limitations, and there are f surprising results.

**6. Rejection Of Claims 1 and 15-18 Under 35 U.S.C. §103(a):**

The Examiner has rejected Claims 1 and 15-18 under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. as applied to claims 1-3, 7-15, 19-22 above, and further in view of Ueda et al. (EP 791,475), indicating:



“As with the polyvinyl alcohol, the primary reference is also silent with respect to particular gelatin that may be used. Therefore, Ueda et al. is cited for teaching of gelatin that is used in the ink jet recording art (see page 3). The secondary reference teaches that gelatins may be pigskin, cow skin, or cow bone, and may be lime-processed, acid processed, or gelatin derivatives. Based upon this teaching it would have been obvious to one of ordinary skill in the art to use a gelatin previously taught for use in ink jet recording media as the gelatin of the primary reference.”

Kawano relates to an ink jet recording sheet comprising a substrate and an ink receptive layer disposed on said substrate, said ink receptive layer containing a pigment and a binder as its main components, the improvement comprising said ink receptive layer being an aqueous composition containing a pigment and an amphoteric latex as its main components, which absorbs water-base ink well, gives high-grade images, and ensures excellent water resistance of printed images. Kawano fails to disclose difficulties with laminate adhesion and fails to disclose the use of a laminate adhesion promoting overcoat layer containing derivatized poly(vinyl alcohol) having at least one hydroxyl group replaced by ether or ester groupings.

Ueda discloses a recording sheet for ink-jet recording, which comprises a support, and provided thereon, an ink receiving layer, wherein the ink receiving layer contains a water soluble polymer, a polymer latex and gelatin, to provide an excellent image under various conditions and an excellent transportability. Ueda fails to disclose laminate adhesion as a problem, and fails to disclose the use of acetoacetylated poly(vinyl alcohol).

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Kawano and Ueda fail to teach, disclose or suggest a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) which



provides better laminate adhesion. Ueda and Kawano also fail to mention the property of laminate adhesion. Ueda, in fact, at pg. 27, paragraph [0090], teaches conventional adjacent layer-to-substrate adhesion ("The layer provided on one or each side of the support may contain a matting agent in an amount of 0.005 to 0.1 g/m<sup>2</sup> in order to minimize adhesion failure such as blocking."). Therefore, the references fail to provide any motivation to modify the reference to produce the laminate adhesion promoting absorbing hydrophilic overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion as presently claimed. The references also fail to provide any likelihood of obtaining improved laminate adhesion by using acetoacetylated poly(vinyl alcohol) as presently claimed. Finally, since the references fail to mention laminate adhesion or the use of acetoacetylated poly(vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

Also, the present invention provides evidence of surprising results. Laminate adhesion relates to more than just the overcoat layer itself. The overcoat layer promotes the adhesion to the adjacent layer, but applies to enhancing the adhesion of all the layers in the laminate – to each adjacent layer, to non-adjacent layers, as well as the whole laminate to the substrate. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. Kawano and Ueda make no disclosure that would lead one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the adhesion of the whole.

In summary, the references fail to suggest or motivate one to modify or combine the references, fail to provide a reasonable expectation of success, fail to teach or suggest all the claim limitations, and there are surprising results.

**7. Rejection Of Claims 1, 7, 8, 21, and 22 Under 35 U.S.C. §102(e):**

The Examiner has rejected Claims 1, 7, 8, 21, and 22 under 35 U.S.C. 102(e) as being anticipated by Niu et al. (6,599,593), as:



“The reference discloses an ink-receiving medium that may be used as an ink jet recording medium (see col. 3, lines 54-58) comprising a substrate, a porous medial layer, and a non-porous top layer on the surface thereof (see the abstract). The top layer may be a combination of an acetoacetylated polyvinyl alcohol, a polyurethane resin dispersion and an epichlorohydrin containing polyamide (see col. 9, lines 6-31). The medial layer may be pigment and polyvinyl alcohol (see col. 16, line 56 to col. 18, lines 24). The layer may also contain a latex resin (see col. 18, lines 25-44). An additional layer may be present between the top layer and the medial layer (see col. 20, lines 30-35). The epichlorohydrin containing polyamide acts as a mordant (see col. 22, line 57 to col. 23, line 28).”

Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently, in a single prior art reference. Niu fails to disclose a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. As a result, Niu fails to anticipate the presently claimed invention. Neither does Niu inherently disclose such a property, as Niu includes the use of carboxycellulose



materials as the binder in the overcoat layer, which compounds have been used by the Applicant as control samples. As a result Niu fails to anticipate the laminate adhesion promoting overcoat layer as presently claimed.

**8. Rejection Of Claims 1, 9-14, 19-22, and 38 Under 35 U.S.C. §103(a):**

The Examiner has rejected Claims 1, 9-14, 19-22, and 38 under 35 U.S.C. 103(a) as being unpatentable over Niu et al., as:

“The reference discloses coating weights rather than coating thicknesses, however, from the disclosure of coating weights, it would have been obvious to one of ordinary skill in the art to determine coating thicknesses for the layers (see col. 19, lines 28-31 and col. 24, lines 35-38). With respect to an additional coat layer between the medial and top layers, since such layers are disclosed by the reference, it would have been obvious to one of ordinary skill in the art to include an additional layer of the same compositional make up in order to increase the coating thickness while avoiding coating problems, such as cracking, which are associated with coating of a single layer of greater thickness.”

Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in



the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Niu fails to teach, disclose or suggest a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Niu also fails to mention the property of laminate adhesion. Therefore, the reference fails to provide any motivation to modify the reference to produce the laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion as presently claimed. The reference also fails to provide any likelihood of obtaining improved laminate adhesion by using acetoacetylated poly(vinyl alcohol) as presently claimed in an overcoat layer. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. In addition, Niu indicates that secondary binders other than derivatized PVA and polyurethane may be used. At least one of these other secondary binders, carboxycellulose, has been utilized as Control Example 4, over which the presently claimed composition demonstrates surprisingly improved adhesion. At best, Niu provides a list of materials that would be obvious to try, some of which have been found not to provide laminate adhesion. Finally, since the reference fails to mention laminate adhesion or the use of acetoacetylated poly(vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

**9. Rejection Of Claims 1, and 4-6 Under 35 U.S.C. §103(a):**

The Examiner has rejected Claims 1, and 4-6 under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593) as applied to claims 1, 2, 7-14, 19-22, 37 and 36 above, and further in view of Tomizawa et al. (6,224,971), as:

“The secondary reference discloses an ink jet recording sheet including acetoacetylated polyvinyl alcohol. The primary reference does not disclose the properties of the disclosed acetoacetylated



polyvinyl alcohol used therein, therefore, it is appropriate to look elsewhere in the same art area for a particular acetoacetylated polyvinyl alcohol to use in the invention of the primary reference. Tomizawa et al. disclose an acetoacetylated polyvinyl alcohol with properties as recited by the instant claims (see col. 2, lines 46-67) although the reference is silent with respect to molecular weight. Both applicant and the secondary reference use a commercially available product from the Gohsefimer Z200 series of Nippon Gohsei Kagaku Kogyo Co. The examiner was unable to determine the molecular weights of each of these polymers. However, they are in the same commercial series of the same company, and have the same degree of saponification and substitution. Therefore, it would have been obvious to one of ordinary skill in the art to determine the particular polyvinyl alcohol from the commercially available series of polymers identified by the prior art as useful in ink jet recording media applications in order to achieve the goals set forth by the primary reference.”

Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.



The Applicants argue that Niu is silent with respect to a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion in a multi-layer format, as claimed.

Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.

Tomizawa discloses novel ink-jet recording sheets having high water resistance, excellent transparency of the ink-receptive layer, ink absorptivity and color developability as well as the advantages of absence of surface tackiness and blocking and a liquid coating composition for forming the ink-receptive coating layer of the recording sheet. The liquid coating composition comprises, as a uniform blend in an aqueous medium, an acetoacetylated polyvinyl alcohol, a polyvinylpyrrolidone resin, and an acidic aqueous dispersion of a colloidal silica, each in a specified weight proportion. Tomizawa fails to disclose laminate adhesion or the use of a laminate adhesion promoting overcoat layer containing acetoacetylated poly(vinyl alcohol). Tomizawa deals with a single coated layer on a substrate, which would suffer from adhesion failure, but not laminate adhesion failure due to the absence of a multiple layer laminate. See col. 4 lines 23-29 ("If desired in order to improve the adhesion between the substrate surface and the ink-receptive layer thereon, it is optional to subject the substrate surface to a treatment having a priming effect such as a corona discharge treatment, ozone treatment and plasma treatment as well as to a coating treatment to form an



undercoating layer of a saturated polyester resin or urethane resin having a thickness in the range, for example, from 0.5 to 5  $\mu\text{m}$ .”)

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Niu and Tomizawa fail to teach, disclose or suggest a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Tomizawa and Niu also fail to mention the property of laminate adhesion. In fact, Tomizawa fails to disclose a laminate structure, disclosing instead a single coated layer on a substrate. The motivation to combine references must come from statements in the prior art, the knowledge of one of ordinary skill in the art or from the nature of the problem to be solved. In re Kotzab, 217 F.3d 1365, 1370 (Fed Cir. 2000). Since Niu fails to mention laminate adhesion, it provides no motivation to look elsewhere. The goals set out in Niu do not include improving laminate adhesion. Tomizawa deals with a single layer coating applied to a substrate and fails to teach anything relating to laminate adhesion or use in a multi-layer format. Therefore, the references fail to provide any motivation to modify the reference to produce the laminate adhesion promoting absorbing hydrophilic overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) over an inner layer to provide laminate adhesion as presently claimed. The Examiner notes that it would have been obvious to one of ordinary skill in the art to determine the particular polyvinyl alcohol, specifically acetoacetylated poly(vinyl alcohol), from the commercially available series of polymers identified by the prior art as useful in ink jet recording media applications in order to achieve the goals set forth by the primary reference. However, Niu fails to teach the goal of improved laminate adhesion. The references also fail to provide any likelihood of obtaining improved laminate adhesion by using a derivatized poly (vinyl alcohol) as presently claimed. Finally, since the references fail to mention laminate adhesion or the use of



acetoacetylated poly(vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

Also, as discussed above, the present invention provides evidence of surprising results. As discussed above, laminate adhesion relates to more than just the overcoat layer itself. The overcoat layer promotes the adhesion to the adjacent layer, but applies to enhancing the adhesion of all the layers in the laminate – to each adjacent layer, to non-adjacent layers, as well as the whole laminate to the substrate. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. Niu makes no disclosure that would lead one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the adhesion of the whole structure and Tomizawa deals with only a single layer.

In summary, the references fail to suggest or motivate one to modify or combine the references, fail to provide a reasonable expectation of success, fail to teach or suggest all the claim limitations, and there are f surprising results.

**10. Rejection Of Claims 1 and 15-18 Under 35 U.S.C. §103(a):**

The Examiner indicates:

“Claims 1 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (6,599,593) as applied to claims 1, 2, 7-14, 19-22, 37 and 38 above, and further in view of Ueda et al. (EP 791,475). As with the polyvinyl alcohol, the primary reference is also silent with respect to particular gelatin that may be used. Therefore, Ueda et al. is cited for teaching of gelatin that is used in the ink jet recording art (see page 3). The secondary reference teaches that gelatins may be pigskin, cow skin, or cow bone, and may be lime-processed, acid processed, or gelatin derivatives. Based upon this teaching it would have been obvious to one of ordinary skill in the art to use a gelatin previously taught for use in ink jet recording media as the gelatin of the primary reference.”



Niu discloses an ink-receiving media print media products having multi-functional capabilities including (A) minimal drying time; (B) improved gloss-control which allows the production of high-gloss or semi-gloss products as desired; and (C) the ability to generate high-definition and light- fast images. A first embodiment (high-gloss) employs a substrate (e.g. polyethylene-coated paper) having a porous medial layer thereon containing a pigment (e.g. silica) and a binder (e.g. polyvinyl alcohol). A non-porous top layer is placed on the medial layer which optimally consists entirely of one or more binders (excluding pigments, etc.) A second embodiment (semi-gloss) employs a comparable substrate and medial layer with a top layer similar to that described above, although at least one pigment (e.g. silica) is employed therein at a level not exceeding about 10% by weight. Niu fails to mention a laminate adhesion promoting overcoat layer.

Ueda discloses a recording sheet for ink-jet recording, which comprises a support, and provided thereon, an ink receiving layer, wherein the ink receiving layer contains a water soluble polymer, a polymer latex and gelatin, to provide an excellent image under various conditions and an excellent transportability. Ueda fails to disclose laminate adhesion as a problem, and fails to disclose the use of acetoacetylated poly(vinyl alcohol).

To establish a prima facie case of obviousness requires, first, there must be some suggestion or motivation, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references (or references when combines) must teach or suggest all the claim limitations. Niu and Ueda fail to teach, disclose or suggest a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion. Ueda and Niu also fail to mention the property of laminate adhesion. Ueda, in fact, at pg. 27, paragraph [0090], teaches conventional adjacent layer-to-substrate adhesion ("The layer provided on one or each side of the support may contain a matting agent in an amount of 0.005 to 0.1 g/m<sup>2</sup> in order to minimize adhesion failure such as blocking."). Therefore, the



references fail to provide any motivation to modify the reference to produce the laminate adhesion promoting absorbing hydrophilic overcoat polymer layer containing acetoacetylated poly(vinyl alcohol) which provides better laminate adhesion as presently claimed. The references also fail to provide any likelihood of obtaining improved laminate adhesion by using acetoacetylated poly(vinyl alcohol) as presently claimed. Finally, since the references fail to mention laminate adhesion or the use of acetoacetylated poly(vinyl alcohol) in an overcoat layer to improve laminate adhesion, the reference fails to teach, disclose or suggest the limitations of the invention as presently claimed.

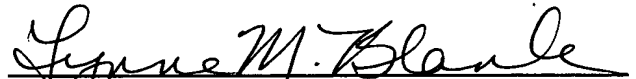
Also, the present invention provides evidence of surprising results. Laminate adhesion relates to more than just the overcoat layer itself. The overcoat layer promotes the adhesion to the adjacent layer, but applies to enhancing the adhesion of all the layers in the laminate – to each adjacent layer, to non-adjacent layers, as well as the whole laminate to the substrate. One would not expect a layer to improve the adhesion properties of the whole coated laminate pack, especially regarding the adhesion of other layers to each other, which are not in contact with the overcoat layer. Niu makes no disclosure that would lead one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the Kawano and Ueda make no disclosure that would lead one of ordinary skill in the art to expect a distant, non-adjacent layer to improve the adhesion of the whole. At best, Niu provides a list of materials that would be obvious to try in an overcoat layer, some of which have been found to not promote laminate adhesion in combination with a gelatinous layer.

In summary, the references fail to suggest or motivate one to modify or combine the references, fail to provide a reasonable expectation of success, fail to teach or suggest all the claim limitations, and there are surprising results.



For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims 1, 3-22, and 38.

Respectfully submitted,

  
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Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.



## **Appendix I - Claims on Appeal**

1. An ink recording element comprising a support having thereon a hydrophilic absorbing layer and a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol).

3. The ink recording element of claim 1 wherein said absorbing hydrophilic overcoat polymer layer further comprises a vinyl latex polymer.

4. The ink recording element of claim 1 wherein said acetoacetylated poly(vinyl alcohol) has a degree of saponification of 80 to 100%.

5. The ink recording element of claim 1 wherein said acetoacetylated poly(vinyl alcohol) has a degree of modification of 2.5 to 15 mol%.

6. The ink recording element of claim 1-wherein said acetoacetylated poly(vinyl alcohol) has a molecular weight of 15, 000 to 150,000.

7. The ink recording element of claim 1 wherein said absorbing hydrophilic overcoat polymer layer comprises a polyurethane dispersion.



8. The ink recording element of claim 7 wherein the weight ratio of derivatized poly(vinyl alcohol) to polyurethane dispersion is between 50:50 and 95:5.

9. The ink recording element of claim 1 further comprising at least one hydrophilic inner layer between said hydrophilic absorbing layer and said absorbing hydrophilic overcoat polymer layer.

10. The ink recording element of claim 9 wherein said inner layer is present in a dry thickness amount of between 0.5 and 5 microns.

11. The ink recording element of claim 9 wherein said inner layer comprises a poly(vinyl alcohol).

12. The ink recording element of claim 11 wherein said inner layer further comprises latex polymer.

13. The ink recording element of claim 11 wherein said inner layer further comprises a polyurethane dispersion.

14. The ink recording element of claim 13 wherein the weight ratio of poly(vinyl alcohol) to polyurethane dispersion is between 50:50 and 95:5.



15. The ink recording element of claim 1 wherein said hydrophilic absorbing layer further comprises gelatin.

16. The ink recording element of claim 15 wherein said gelatin comprises acid processed osseine gelatin.

17. The ink recording element of claim 15 wherein said gelatin comprises pigskin gelatin.

18. The ink recording element of claim 16 wherein said gelatin comprises modified pigskin gelatin.

19. The ink recording element of claim 1 wherein said hydrophilic absorbing layer is present in a dry thickness of from 5 to 60 microns.

20. The ink recording element of claim 1 wherein said absorbing hydrophilic overcoat polymer layer is present in a dry thickness of between 0.5 and 5 microns.

21. The ink recording element of claim 1 further comprising dye mordants.

22. The ink recording element of claim 1 wherein said recording element is an inkjet recording element.



38. An ink recording element comprising a support having thereon a hydrophilic absorbing layer and a laminate adhesion promoting absorbing hydrophilic overcoat polymer layer comprising acetoacetylated poly(vinyl alcohol) and an anionic vinyl latex polymer or an anionic polyurethane dispersion.



## **Appendix II - Evidence**



**Appendix III – Related Proceedings**

None.



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Charles E. Romano

INK RECORDING ELEMENT

Serial No. 10/068,824

Filed 06 February 2002

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*Christine Tolhurst*  
Christine Tolhurst

*July 21, 2004*  
Date

DECLARATION UNDER RULE 132

1. I, Charles E. Romano, Jr., state that I am a resident and citizen of the United States. I obtained a Bachelor of Science degree in Chemistry from LeMoyne College in Syracuse, New York in 1982. I have been an employee of Eastman Kodak Company (hereinafter referred to as Kodak) since May of 1985. I have been assigned to work in product development and research of imaging processes, including areas relating to inkjet inks and inkjet elements.
2. I am one of the co-inventors of U.S. Serial No. US 10/068,824.
3. I prepared and coated the Examples described in the present Application.
4. The surfactants used in the overcoat layer of Example 1 were added as coating aids, without which repellencies would occur, resulting in an unacceptable coating.
5. These surfactants were also utilized in comparative Control Examples 1-6, as indicated by the description in the Examples.



6. For example, Control Example 1 states "As in example 1 except that the overcoat layer consisted of hydroxyethyl cellulose (HEC QP 300, Dow)," which is intended to indicate that the Z-320 acetoactylated poly(vinyl alcohol) was switched with hydroxyethyl cellulose, but everything else remained the same.
7. One of ordinary skill in the art would recognize that coating aid would be added to the exemplary overcoat layers to provide acceptable coatings, free of repellencies.
8. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: 7-14-04

Charles E. Romano, Jr.  
Charles E. Romano, Jr.





Designation: F 2226 – 03

## Standard Practice for Determining the Adhesion of Prints and Laminating Films<sup>1</sup>

This standard is issued under the fixed designation F 2226; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This practice covers procedures for printing a document, applying a laminating film and subsequently delaminating. The laminate film is used for encapsulating and mounting prints to preserve them in office and outdoor environments.

1.2 This practice describes procedures for determining the adhesion strength of lamination film when it is applied to black and white and color prints produced by printers, copiers and other reprographic devices.

1.3 This practice can be used to test different laminates with a given set of inks and media or it can be used to evaluate inks and media with a given laminate.

1.4 This practice specifies size of specimens and defines conditions for measurement of peel adhesion at a 180° angle and delamination speed.

1.5 This practice is applicable to constructions where the substrate surface is subject to failure under peel conditions.

1.6 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Terminology

#### 2.1 Definitions:

2.1.1 *high temperature lamination*—lamination at temperature not lower than 80°C (180°F). The maximum applied temperature is 115 to 121°C (240 to 250°F).

2.1.2 *lamination film*—plastic film having an adhesive layer on one side. The film can be glossy, semi-glossy, or matte and contain additives modifying its optical properties. The film usually has a thickness between 25 to 250 μ (1 to 10 mils).

2.1.3 *low temperature lamination*—lamination at room temperature with applied pressure mostly to mounting board using a pressure-sensitive adhesive.

2.1.4 *mounting board*—paperboard, plastic board, or any supporting board, which could be used to display prints.

2.1.5 *printed media*—recording elements used by printers to receive inks or toners. The substrate may be paper, plastic, canvas, fabric, or other ink receptive material. The substrate may, or not, be coated with an ink receptive layer(s).

#### 2.2 Definitions of Terms Specific to This Standard:

2.2.1 *adhesion strength of a laminate*—load per unit necessary to remove the laminate from a prescribed surface when measured in accordance with this test method.

2.2.2 *delaminating/debonding*—separation of a laminating film from a printed media.

2.2.3 *kinetic peak*—load per unit presenting the maximum force that occurs during the average time during the peel test. See Fig. 1.

2.2.4 *peel or stripping strength*—the average load per unit width of sample required to separate or peel the laminate from the printed media at the adhered interface at a separation angle of approximately 180° and at a separation rate of preferably 308 mm (12 in.) per minute. It is expressed in Newtons per meter width, grams per inch width, or ounces per inch width.

2.2.5 *root-mean-square (RMS)*—a mathematical treatment of the force data intended to qualify the extent to which the value deviates about its average value.

2.2.6 *static peak*—load per unit presenting the maximum force that occurs during the delay time before starting the peel test. See Fig. 1.

2.2.7 *valley*—load per unit presenting minimum force during the average time under kinetic conditions. See Fig. 1.

### 3. Summary of Practice

3.1 Coated or uncoated substrate is printed under standard conditions using four primary, three secondary colors and composite black. Eight color strips 2.54 mm wide and one unprinted are generated.

3.2 The prints having eight color strips are conditioned (preferably for 24 h) and subsequently laminated.

3.3 The laminated prints are conditioned (preferably for 24 h), cut into 25.4-mm strips and subsequently delaminated.

3.4 Comparative studies require testing under well-defined conditions.

### 4. Significance and Use

4.1 The image life of printed media displayed in both typical office and outdoor environments can be extended by lamination or encapsulation. While natural aging is the most reliable method of assessing lamination adhesion, the length of

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.03 on Research.

Current edition approved Jan. 10, 2003. Published March 2003.



desirable to have high bond strength to the recording element with failure occurring where the adhesive debonds from the ink receptive.

## 5. Interferences

5.1 Since the ability of laminating film to adhere to printed media is dependent on temperature and humidity, it is important that lamination be assessed under the conditions appropriate to the end use applications. While printed media may be handled and displayed under a variety of conditions, this test practice is intended to measure peel strength in typical office environments.

5.2 It is recognized that the peel strength of the laminate to the printed media is dependent on toner or ink color, toner or ink load, temperature and relative humidity. Additionally, it is dependent on the substrate, type and coat weight of absorptive layer and the colorant type (dye versus pigment). Consequently, test results must be determined individually for each printed recording media/laminate.

5.3 The peel strength of the laminate is dependent on lamination temperature and should be tested at the manufacturers recommended temperature for the best performance.

5.4 Using a laminating film thicker than 75  $\mu$  (3 mil) can create a problem in obtaining a 180° angle at the start of the test. A starting angle of less than 180° can significantly change the peel speed and mostly lead to delamination from the support instead of the coating (tearing of paper base).

5.5 The variation in recording and laminating elements requires carrying out comparative tests under well-defined conditions.

5.6 Because these measurements concern surfaces, their condition is critical to the values obtained. Be sure to keep all print surfaces clean and free from contaminants, including fingerprints.

5.7 One of the most significant (and occasionally ignored) influences on peel values is the time that elapses from lamination until the test is performed. Values can change by 100 % depending on this "aging." Peel tests intrinsically produce quite a bit of data scatter from test to test. Keep a close watch on the results to be sure that your results are truly representative of your materials. Kinetic Peak and Valley provide important information about uniformity of lamination of the tested specimen.

5.8 Paper media have a tendency to tear the support after initial delamination from the bonding interface. It is well documented that at the same coat weight of ink receiving material, lighter paper media have higher tendency to support failure than heavier ones. Static Peak can be very useful in evaluation lamination performance of paper media. It is recommended to use Static Peak values to compare media having paper base failure. Additionally, it can also be used in evaluating media having delamination from the bonding interface. Media having paper failure but high Static Peak values are considered superior than media delaminated from the bond interface but having low peel strength.

5.9 Reducing laminating temperature could eliminate paper media failure. Lower laminating temperature reduces bonding strength between media and the laminate. In most cases, paper failure occurs when the laminate bonding strength is very high.

## PRINTING

### 6. Test Specimen

6.1 The substrate, method of printing, ink or toner lay down, and handling of printed specimens shall be consistent with their anticipated end use.

6.2 The test image may be generated with personal computer using drawing/graphics, or page layout software able to generate composite black, saved as print file for each printer/method of printing (contributing its unique ink and ink/receiver interactions that may impact lamination.) Each print file should have its filename, type, and version identified in the image area and a place for experimental notes, for example, time, printer, environmental conditions, operator. The printer setting and a trial print of each print file version should be archived.

6.3 The recommended test image should consist of three primary and three secondary color strips (25.4 by 215.9 mm) plus a non-printed strip (25.4 by 215.9 mm). The colors should be printed in parallel in the following order: black (K), cyan, magenta, yellow, blue, green, red, white, composite black (C).

6.4 It is recommend to print in landscape mode having the 25.4-mm strips perpendicular to paper machine direction.

6.5 The test image used in comparison printers or inks (media laminated with the same film) should provide the same color elements.

### 7. Procedure

7.1 *Preparation of Printer*—When using an ink jet printer, print heads should be aligned, calibrated and checked for any nozzle clogging. Nozzle failure will reduce the ink lay down and can change peel strength.

7.2 The color strips printed should be generated using print files containing the appropriate printer setup specific for each application.

7.3 It is recommended that the color strip be printed as Postscript 3 file without color corrections using standard ink load limits or media selection. The printing mode is dependent on media type such as glossy photo, semi-glossy, paper bond, heavy-coated bond, and so forth.

7.4 Printing mode of the test image should be the same as recommended for media applications and available associated literature or a flyer.

7.5 Potential variables, such as temperature and relative humidity, must be monitored and controlled to guard against sample-induced changes.

7.6 Printing should be carried out at 23°C and 50 % relative humidity.

7.7 Printing can be done at extreme conditions such as 15°C, 20 % relative humidity and 38°C, 80 % relative humidity, but information about these conditions should be recorded with the lamination data.

### 8. Conditioning

8.1 It is recommended that samples be conditioned at 23°C and 50 % relative humidity for at least 24 h prior to printing and for at least 24 h subsequent to lamination. Specimens should be visually inspected for color uniformity and surface irregularities, which could adversely affect color densities and subsequently lamination.



8.2 The above conditioning step is pertinent only where media evaluation or comparison is needed. Obviously, as a production tool, the conditioning period is not practical. Therefore, when media are coated in production, the specimens should be obtained from each roll and checked as soon as possible in a repeatable procedure appropriate to the operation. It is imperative that operators use caution in selecting and preparing specimens to maintain good uniformity.

## LAMINATION

### 9. Apparatus

9.1 A laminator used for continuous laminating, mounting and encapsulating. The laminator should have precise temperature control and different operating speeds to ensure that outgassing from inks does not effect adhesion or cause bubbles in the print. The laminator should:

9.2 Be capable of applying heat-activated or pressure-sensitive materials, or a combination of both.

9.3 Have an infinitely variable nip opening for all materials up to 40 mm (1.5 in.).

9.4 Have a digital or analog readout of speed.

9.5 Downward pressure and vacuum table are recommended.

### 10. Procedure

10.1 The print samples should be laminated 24 h after printing. The actual lamination time after printing should be presented in the report.

10.2 Before lamination, a strip of paper (50.8 by 216 mm) should be placed vertically on the top of a portion of the printed test pattern for each of the colors. About half of paper strip should cover the printed area and the other half should cover the unprinted area. This procedure allows the free end of the test specimen to be separated.

10.3 Laminating films that are 75  $\mu$  (3 mil) thick should be used for comparison purposes. Thicker films: 125, 175, and 250  $\mu$  (5, 7, and 10 mils) make it difficult to obtain the 180°C angle required in the test. At lower angles the film has a tendency to rip the support instead of delaminating from the coating. Films that are 25 or 50  $\mu$  (1 or 2 mil) thick have a tendency to elongate affecting the peel speed.

10.4 The temperature of the upper and lower rollers of laminator should be measured by infrared sensor and recorded. For precise measured and repeatability of the test, the difference between set up temperature and laminating rollers temperature should not be higher than  $\pm 5^\circ\text{C}$ .

10.5 Speed of lamination for paper media having base weight in the range 90 to 170 gms should be 0.9 m/min (3 ft/min). Lower or higher speed can be used depending on film thickness, paper base weight, and lamination temperature.

10.6 Lamination pressure can be expressed as a half crank or bars (psi) value if a laminator is equipped with a gage.

10.7 The print should be placed centrally in the laminator to minimize temperature variation along the rollers.

10.8 The printed samples should be conditioned 24 h before lamination at  $23 \pm 2^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) and  $50 \pm 5\%$ .

10.9 The laminations can be carried out in the office environment. However, samples printed and conditioned at

different temperatures and humidities other than the ones above should be handled in sealed plastic bags and immediately laminated. This procedure preserves moisture in the media and provides reproducible tests.

## DELAMINATION

### 11. Sampling and Specimen Preparation

11.1 *Materials*—Razor blade, single edge or cutting board. Cellophane tape, 25 mm (1 in.) wide, #610 “Scotch” brand or equivalent.

11.2 Using the specimen cutter, cut nine 215.9 by 25.4 mm (8.5 by 1 in.) specimens for each color and unprinted background from the test image.

11.3 Prepare three test specimens for each lamination condition.

### 12. Conditioning

12.1 Normally, condition all laminate specimens 24 h by exposure to a relative humidity of  $50 \pm 5\%$  at  $23 \pm 2^\circ\text{C}$  ( $73.4 \pm 3.6^\circ\text{F}$ ) to provide additional time for equilibration of adhesive containing interfaces.

12.2 The above conditioning step is pertinent only when doing comparative testing where laminate films and media evaluation or comparison is needed. Obviously, as a production tool, the conditioning period is not practical. Therefore, when laminate adhesion is measured in production, the specimens should be obtained from each laminate roll and checked as soon as possible in a repeatable procedure appropriate to the operation.

### 13. Apparatus

13.1 A constant-rate-of-extension (CER) tension tester available from Instrumentors, Inc. Strongville, OH, adequate load range to handle all materials of this type, appropriate grips, and variable or at least 304.8 mm (12 in.) per minute test speed. The tester shall have two clamps (or one) with centers in the same plane, parallel with the direction of the motion of the stressing clam, and so aligned that they will hold the specimen wholly in the same plane.

13.2 Ensure that the peel tester is level.

13.3 Follow the manufacturer’s instructions for zeroing and calibrating the peel tester and setting it to the proper speed and load range to properly measure the anticipated load.

13.4 The instrument shall be calibrated to an accuracy of 0.5 % of full scale and the readings are between 30 and 90 % of the full load range.

### 14. Procedure

14.1 The hardware setup for a typical 180° peel test is shown in Fig. 3.

14.2 The testing speed should be of 304.8 mm (12 in.) per minute, although higher speeds can be used for release force measurements.

14.3 Conduct testing as soon as possible after removal of the test specimens from the conditioning atmosphere and preferably under the same environmental conditions.

14.4 To maintain a separation rate of 304.8 mm (12 in.) per minute, specimens must be relatively non-extensible in the



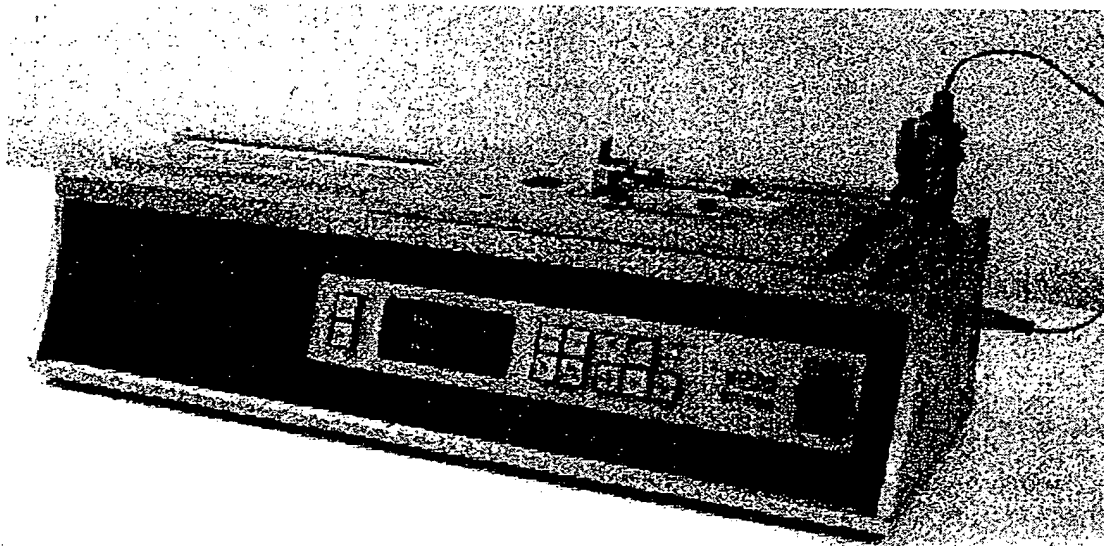


FIG. 3 Constant-Rate-of-Extension (CER) Tension Tester

expected loading range. Where a material is sufficiently extensible (that is, stretch is greater than about 15 %) to radically lower the stripping rate, reinforce the extensible member with 25.4 mm (1 in.) width non-extensible tape or change the thickness of laminating film. In reporting such a test, the backing material and method must be completely identified. It is recommended to use 3 mil laminating film for media evaluation.

14.5 Cohesive or adhesive failure may be determined by observation. Cohesive failure refers to failure in the adhesive or specimen material itself. Adhesive failure refers to the lack of adherence between materials.

14.6 Paper strips placed on top of the test image before lamination allow the free ends to be separated from the test specimen (by hand) for a distance of approximately 51 mm (2 in.). It is not recommended to initiate delamination by pulling the coating from the substrate or separating the plies of the lamination.

14.7 Place the specimen in the tester by clamping the free end of the film with the protective paper in the grip. Attach the free end of the print to the platform by pressure-sensitive tape. The peel strength of the tape has to be higher than the peel strength of the test specimen.

14.8 Align the free ends of the specimen symmetrically in the grips so that the tension is distributed uniformly.

14.9 During the actual peel test procedure, it takes a small, but finite, amount of time for the peel forces to reach a dynamic equilibrium. The selectable Delay Time for the instrument inhibits the measurement of kinetic peak, valley, average and PMS values during the Delay Time. For most standards work, a delay of 1 or 2 seconds is satisfactory. For higher speeds, a 1 second may "waste" too much of the sample.

14.10 Begin the test. After the platform starts moving, and at the end of your selected Delay Time, the Averaging light will come on, persisting for the length of time that you selected as Average Time.

14.11 At the end of that time, the platen will stop (depending on how you set up the (Platen Stop Mode) and the Results screen will display the test data.

14.12 Observe the peel force over a separation distance of at least 101.6 mm (4 in.) or the average time of at least 10 s. However, the time of 20 s is recommended. Then stop the tester and return the movable grip to its starting position. Remove the tested specimen.

14.12.1 The Average Time that you use will be dependent on the testing speed, the sample length, and, in certain instances, how much test time you can budget for each test. For lamination work, 10 s Average Time is a good value to start out with.

14.13 If the RMS is higher than 10 % of average load, the test should be repeated.

14.14 Repeat steps 14.3-14.12 with remaining specimens.

## 15. Interpretation of Results

15.1 Determine the peel or stripping strength for each specimen in Newtons per meter (or grams per 1 in.) width. For standard 25.4 mm width specimens, the peel value is equal to the recorded load. The average peel over the entire separation distance is the generally preferred value.

15.2 For each series of specimens, calculate the arithmetic average of all of the values obtained as the average for each color specimen and unprinted one.

15.3 Root-Mean-Square (RMS) is calculated according to the following formula:

$$RMS = \sqrt{\frac{\sum_{i=1}^N (L_N - L_{AVG})^2}{N}} \quad (1)$$

where:

$L_N$  = instantaneous force sample,  
 $L_{AVG}$  = previously determined mean of all  $N$  readings, and  
 $N$  = total number of data samples.



NOTE 1—The type of equipment used to determine peel strength must be stated.

## 16. Report

16.1 Report the following information:

16.1.1 Specimen identification, including the printer, method of printing, and the media type.

16.1.2 Lamination temperature, speed, applied pressure on nip, relative humidity and temperature in the room, where lamination is carried out, and time after printing.

16.1.3 Individual test loads.

16.1.4 Average peel or stripping strength in Newtons per meter (or grams per 1 in.) width for each color and the unprinted area.

16.1.5 Type of failure (see 4.6).

16.1.6 In the case of paper failure the value of static peak should be also reported.

16.1.7 Any unusual characteristics. Include backing if required and the conditioning cycle if other than standard.

## 17. Precision and Bias

17.1 A statement of bias is not applicable in view of the unavailability of a standard reference for these properties.

## 18. Keywords

18.1 accelerate aging; adhesion; bond strength; debonding; delamination; encapsulating; high temperature laminates; ink jet; lamination; low temperature laminates; media; mounting; peel strength; pressure-sensitive laminates; printing; thickness

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Designation: D 3359 – 02

Attachment B

## Standard Test Methods for Measuring Adhesion by Tape Test<sup>1</sup>

This standard is issued under the fixed designation D 3359; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 These test methods cover procedures for assessing the adhesion of coating films to metallic substrates by applying and removing pressure-sensitive tape over cuts made in the film.

1.2 Test Method A is primarily intended for use at job sites while Test Method B is more suitable for use in the laboratory. Also, Test Method B is not considered suitable for films thicker than 5 mils (125 μm).

NOTE 1—Subject to agreement between the purchaser and the seller, Test Method B can be used for thicker films if wider spaced cuts are employed.

1.3 These test methods are used to establish whether the adhesion of a coating to a substrate is at a generally adequate level. They do not distinguish between higher levels of adhesion for which more sophisticated methods of measurement are required.

NOTE 2—It should be recognized that differences in adherability of the coating surface can affect the results obtained with coatings having the same inherent adhesion.

1.4 In multicoat systems adhesion failure may occur between coats so that the adhesion of the coating system to the substrate is not determined.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.6 *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and

#### Related Coating Products<sup>2</sup>

D 823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels<sup>2</sup>

D 1000 Test Method For Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications<sup>3</sup>

D 1730 Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting<sup>4</sup>

D 2092 Guide for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting<sup>5</sup>

D 2370 Test Method for Tensile Properties of Organic Coatings<sup>2</sup>

D 3330 Test Method for Peel Adhesion of Pressure-Sensitive Tape<sup>6</sup>

D 3924 Specification for Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials<sup>2</sup>

D 4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser<sup>2</sup>

### 3. Summary of Test Methods

3.1 *Test Method A*—An X-cut is made through the film to the substrate, pressure-sensitive tape is applied over the cut and then removed, and adhesion is assessed qualitatively on the 0 to 5 scale.

3.2 *Test Method B*—A lattice pattern with either six or eleven cuts in each direction is made in the film to the substrate, pressure-sensitive tape is applied over the lattice and then removed, and adhesion is evaluated by comparison with descriptions and illustrations.

### 4. Significance and Use

4.1 If a coating is to fulfill its function of protecting or decorating a substrate, it must adhere to it for the expected service life. Because the substrate and its surface preparation (or lack of it) have a drastic effect on the adhesion of coatings, a method to evaluate adhesion of a coating to different substrates or surface treatments, or of different coatings to the

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 06.01.

<sup>3</sup> *Annual Book of ASTM Standards*, Vol 10.01.

<sup>4</sup> *Annual Book of ASTM Standards*, Vol 02.05.

<sup>5</sup> *Annual Book of ASTM Standards*, Vol 06.02.

<sup>6</sup> *Annual Book of ASTM Standards*, Vol 15.09.



same substrate and treatment, is of considerable usefulness in the industry.

4.2 The limitations of all adhesion methods and the specific limitation of this test method to lower levels of adhesion (see 1.3) should be recognized before using it. The intra- and inter-laboratory precision of this test method is similar to other widely-accepted tests for coated substrates (for example, Test Method D 2370 and Test Method D 4060), but this is partly the result of it being insensitive to all but large differences in adhesion. The limited scale of 0 to 5 was selected deliberately to avoid a false impression of being sensitive.

## TEST METHOD A—X-CUT TAPE TEST

### 5. Apparatus and Materials

5.1 *Cutting Tool*—Sharp razor blade, scalpel, knife or other cutting devices. It is of particular importance that the cutting edges be in good condition.

5.2 *Cutting Guide*—Steel or other hard metal straightedge to ensure straight cuts.

5.3 *Tape*—25-mm (1.0-in.) wide semitransparent pressure-sensitive tape<sup>7</sup> with an adhesion strength agreed upon by the supplier and the user is needed. Because of the variability in adhesion strength from batch-to-batch and with time, it is essential that tape from the same batch be used when tests are to be run in different laboratories. If this is not possible the test method should be used only for ranking a series of test coatings.

5.4 *Rubber Eraser*, on the end of a pencil.

5.5 *Illumination*—A light source is helpful in determining whether the cuts have been made through the film to the substrate.

### 6. Test Specimens

6.1 When this test method is used in the field, the specimen is the coated structure or article on which the adhesion is to be evaluated.

6.2 For laboratory use apply the materials to be tested to panels of the composition and surface conditions on which it is desired to determine the adhesion.

NOTE 3—Applicable test panel description and surface preparation methods are given in Practice D 609 and Practices D 1730 and D 2092.

NOTE 4—Coatings should be applied in accordance with Practice D 823, or as agreed upon between the purchaser and the seller.

NOTE 5—If desired or specified, the coated test panels may be subjected to a preliminary exposure such as water immersion, salt spray, or high humidity before conducting the tape test. The conditions and time of exposure will be governed by ultimate coating use or shall be agreed upon between the purchaser and seller.

### 7. Procedure

7.1 Select an area free of blemishes and minor surface imperfections. For tests in the field, ensure that the surface is

clean and dry. Extremes in temperature or relative humidity may affect the adhesion of the tape or the coating.

7.1.1 For specimens which have been immersed: After immersion, clean and wipe the surface with an appropriate solvent which will not harm the integrity of the coating. Then dry or prepare the surface, or both, as agreed upon between the purchaser and the seller.

7.2 Make two cuts in the film each about 40 mm (1.5 in.) long that intersect near their middle with a smaller angle of between 30 and 45°. When making the incisions, use the straightedge and cut through the coating to the substrate in one steady motion.

7.3 Inspect the incisions for reflection of light from the metal substrate to establish that the coating film has been penetrated. If the substrate has not been reached make another X in a different location. Do not attempt to deepen a previous cut as this may affect adhesion along the incision.

7.4 Remove two complete laps of the pressure-sensitive tape from the roll and discard. Remove an additional length at a steady (that is, not jerked) rate and cut a piece about 75 mm (3 in.) long.

7.5 Place the center of the tape at the intersection of the cuts with the tape running in the same direction as the smaller angles. Smooth the tape into place by finger in the area of the incisions and then rub firmly with the eraser on the end of a pencil. The color under the transparent tape is a useful indication of when good contact has been made.

7.6 Within  $90 \pm 30$  s of application, remove the tape by seizing the free end and pulling it off rapidly (not jerked) back upon itself at as close to an angle of 180° as possible.

7.7 Inspect the X-cut area for removal of coating from the substrate or previous coating and rate the adhesion in accordance with the following scale:

- 5A No peeling or removal,
- 4A Trace peeling or removal along incisions or at their intersection,
- 3A Jagged removal along incisions up to 1.6 mm (1/16 in.) on either side,
- 2A Jagged removal along most of incisions up to 3.2 mm (1/8 in.) on either side,
- 1A Removal from most of the area of the X under the tape, and
- 0A Removal beyond the area of the X.

7.8 Repeat the test in two other locations on each test panel. For large structures make sufficient tests to ensure that the adhesion evaluation is representative of the whole surface.

7.9 After making several cuts examine the cutting edge and, if necessary, remove any flat spots or wire-edge by abrading lightly on a fine oil stone before using again. Discard cutting tools that develop nicks or other defects that tear the film.

### 8. Report

8.1 Report the number of tests, their mean and range, and for coating systems, where the failure occurred that is, between first coat and substrate, between first and second coat, etc.

8.2 For field tests report the structure or article tested, the location and the environmental conditions at the time of testing.

8.3 For test panels report the substrate employed, the type of coating, the method of cure, and the environmental conditions at the time of testing.

8.4 If the adhesion strength of the tape has been determined in accordance with Test Methods D 1000 or D 3330, report the

<sup>7</sup> Permaceel 99, manufactured by Permaceel, New Brunswick, NJ 08903, and available from various Permaceel tape distributors, is reported to be suitable for this purpose. The manufacturer of this tape and the manufacturer of the tape used in the interlaboratory study (see RR: D01-1008), have advised this subcommittee that the properties of these tapes were changed. Users of it should, therefore, check whether current material gives comparable results to previous supplied material.



results with the adhesion rating(s). If the adhesion strength of the tape has not been determined, report the specific tape used and its manufacturer.

8.5 If the test is performed after immersion, report immersion conditions and method of sample preparation.

## 9. Precision and Bias <sup>8</sup>

9.1 In an interlaboratory study of this test method in which operators in six laboratories made one adhesion measurement on three panels each of three coatings covering a wide range of adhesion, the within-laboratories standard deviation was found to be 0.33 and the between-laboratories 0.44. Based on these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level:

9.1.1 *Repeatability*—Provided adhesion is uniform over a large surface, results obtained by the same operator should be considered suspect if they differ by more than 1 rating unit for two measurements.

9.1.2 *Reproducibility*—Two results, each the mean of triplicates, obtained by different operators should be considered suspect if they differ by more than 1.5 rating units.

9.2 Bias cannot be established for these test methods.

## TEST METHOD B—CROSS-CUT TAPE TEST

### 10. Apparatus and Materials

10.1 *Cutting Tool*<sup>9</sup>—Sharp razor blade, scalpel, knife or other cutting device having a cutting edge angle between 15 and 30° that will make either a single cut or several cuts at once. It is of particular importance that the cutting edge or edges be in good condition.

10.2 *Cutting Guide*—If cuts are made manually (as opposed to a mechanical apparatus) a steel or other hard metal straight-edge or template to ensure straight cuts.

10.3 *Rule*—Tempered steel rule graduated in 0.5 mm for measuring individual cuts.

10.4 *Tape*, as described in 5.3.

10.5 *Rubber Eraser*, on the end of a pencil.

10.6 *Illumination*, as described in 5.5.

10.7 *Magnifying Glass*—An illuminated magnifier to be used while making individual cuts and examining the test area.

### 11. Test Specimens

11.1 Test specimens shall be as described in Section 6. It should be noted, however, that multitip cutters<sup>10</sup> provide good results only on test areas sufficiently plane that all cutting edges contact the substrate to the same degree. Check for flatness with a straight edge such as that of the tempered steel rule (10.3).

<sup>8</sup> Supporting data are available from ASTM International Headquarters. Request RR: D01-1008.

<sup>9</sup> Multiblade cutters are available from a few sources that specialize in testing equipment for the paint industry. One supplier that has assisted in the refinement of these methods is given in footnote 10.

<sup>10</sup> The sole source of supply of the multitip cutter for coated pipe surfaces known to the committee at this time is Paul N. Gardner Co., 316 NE First St., Pompano Beach, FL 33060. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,<sup>1</sup> which you may attend.

## 12. Procedure

12.1 Where required or when agreed upon, subject the specimens to a preliminary test before conducting the tape test (see Note 3). After drying or testing the coating, conduct the tape test at room temperature as defined in Specification D 3924, unless D 3924 standard temperature is required or agreed.

12.1.1 For specimens which have been immersed: After immersion, clean and wipe the surface with an appropriate solvent which will not harm the integrity of the coating. Then dry or prepare the surface, or both, as agreed upon between the purchaser and the seller.

12.2 Select an area free of blemishes and minor surface imperfections, place on a firm base, and under the illuminated magnifier, make parallel cuts as follows:

12.2.1 For coatings having a dry film thickness up to and including 2.0 mils (50 µm) space the cuts 1 mm apart and make eleven cuts unless otherwise agreed upon.

12.2.2 For coatings having a dry film thickness between 2.0 mils (50 µm) and 5 mils (125 µm), space the cuts 2 mm apart and make six cuts. For films thicker than 5 mils use Test Method A.<sup>11</sup>

12.2.3 Make all cuts about 20 mm (¾ in.) long. Cut through the film to the substrate in one steady motion using just sufficient pressure on the cutting tool to have the cutting edge reach the substrate. When making successive single cuts with the aid of a guide, place the guide on the uncut area.

12.3 After making the required cuts brush the film lightly with a soft brush or tissue to remove any detached flakes or ribbons of coatings.

12.4 Examine the cutting edge and, if necessary, remove any flat spots or wire-edge by abrading lightly on a fine oil stone. Make the additional number of cuts at 90° to and centered on the original cuts.

12.5 Brush the area as before and inspect the incisions for reflection of light from the substrate. If the metal has not been reached make another grid in a different location.

12.6 Remove two complete laps of tape and discard. Remove an additional length at a steady (that is, not jerked) rate and cut a piece about 75 mm (3 in.) long.

12.7 Place the center of the tape over the grid and in the area of the grid smooth into place by a finger. To ensure good contact with the film rub the tape firmly with the eraser on the end of a pencil. The color under the tape is a useful indication of when good contact has been made.

12.8 Within 90 ± 30 s of application, remove the tape by seizing the free end and rapidly (not jerked) back upon itself at as close to an angle of 180° as possible.

12.9 Inspect the grid area for removal of coating from the substrate or from a previous coating using the illuminated magnifier. Rate the adhesion in accordance with the following scale illustrated in Fig. 1:

<sup>11</sup> Test Method B has been used successfully by some people on coatings greater than 5 mils (0.13 mm) by spacing the cuts 5 mm apart. However, the precision values given in 14.1 do not apply as they are based on coatings less than 5 mm (0.13 mm) in thickness.



- 5B The edges of the cuts are completely smooth; none of the squares of the lattice is detached.
- 4B Small flakes of the coating are detached at intersections; less than 5 % of the area is affected.
- 3B Small flakes of the coating are detached along edges and at intersections of cuts. The area affected is 5 to 15 % of the lattice.
- 2B The coating has flaked along the edges and on parts of the squares. The area affected is 15 to 35 % of the lattice.
- 1B The coating has flaked along the edges of cuts in large ribbons and whole squares have detached. The area affected is 35 to 65 % of the lattice.
- 0B Flaking and detachment worse than Grade 1.

12.10 Repeat the test in two other locations on each test panel.

### 13. Report

13.1 Report the number of tests, their mean and range, and for coating systems, where the failure occurred, that is, between first coat and substrate, between first and second coat, etc.

13.2 Report the substrate employed, the type of coating and the method of cure.

13.3 If the adhesion strength has been determined in accordance with Test Methods D 1000 or D 3330, report the results with the adhesion rating(s). If the adhesion strength of the tape has not been determined, report the specific tape used and its manufacturer.

13.4 If the test is performed after immersion, report immersion conditions and method of sample preparation.

### 14. Precision and Bias <sup>8</sup>

14.1 On the basis of two interlaboratory tests of this test method in one of which operators in six laboratories made one adhesion measurement on three panels each of three coatings covering a wide range of adhesion and in the other operators in six laboratories made three measurements on two panels each of four different coatings applied over two other coatings, the pooled standard deviations for within- and between-laboratories were found to be 0.37 and 0.7. Based on these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level:

14.1.1 *Repeatability*—Provided adhesion is uniform over a large surface, results obtained by the same operator should be considered suspect if they differ by more than one rating unit for two measurements.

CLASSIFICATION OF ADHESION TEST RESULTS		
CLASSIFICATION	PERCENT AREA REMOVED	SURFACE OF CROSS-CUT AREA FROM WHICH FLAKING HAS OCCURRED FOR SIX PARALLEL CUTS AND ADHESION RANGE BY PERCENT
5B	0% None	
4B	Less than 5%	
3B	5 - 15%	
2B	15 - 35%	
1B	35 - 65%	
0B	Greater than 65%	

FIG. 1 Classification of Adhesion Test Results

14.1.2 *Reproducibility*—Two results, each the mean of duplicates or triplicates, obtained by different operators should be considered suspect if they differ by more than two rating units.

14.2 Bias cannot be established for these test methods.

### 15. Keywords

15.1 adhesion; crosscut adhesion test method; tape; tape adhesion test method; X-cut adhesion test method



## APPENDIX

(Nonmandatory Information)

### X1. COMMENTARY

#### X1.1 Introduction

X1.1.1 Given the complexities of the adhesion process, can adhesion be measured? As Mittal (1)<sup>12</sup> has pointed out, the answer is both yes and no. It is reasonable to state that at the present time no test exists that can precisely assess the actual physical strength of an adhesive bond. But it can also be said that it is possible to obtain an indication of relative adhesion performance.

X1.1.2 Practical adhesion test methods are generally of two types: “*implied*” and “*direct*.” “*Implied*” tests include indentation or scribe techniques, rub testing, and wear testing. Criticism of these tests arises when they are used to quantify the strength of adhesive bonding. But this, in fact, is not their purpose. An “*implied*” test should be used to assess coating performance under actual service conditions. “*Direct*” measurements, on the other hand, are intended expressly to measure adhesion. Meaningful tests of this type are highly sought after, primarily because the results are expressed by a single discrete quantity, the force required to rupture the coating/substrate bond under prescribed conditions. Direct tests include the Hesiometer and the Adherometer (2). Common methods which approach the direct tests are peel, lap-shear, and tensile tests.

#### X1.2 Test Methods

X1.2.1 In practice, numerous types of tests have been used to attempt to evaluate adhesion by inducing bond rupture by different modes. Criteria deemed essential for a test to warrant large-scale acceptance are: use of a straightforward and unambiguous procedure; relevance to its intended application; repeatability and reproducibility; and quantifiability, including a meaningful rating scale for assessing performance.

X1.2.2 Test methods used for coatings on metals are: peel adhesion or “tape testing;” Gardner impact flexibility testing; and adhesive joint testing including shear (lap joint) and direct tensile (butt joint) testing. These tests do not strictly meet all the criteria listed, but an appealing aspect of these tests is that in most cases the equipment/instrumentation is readily available or can be obtained at reasonable cost.

X1.2.3 A wide diversity of tests methods have been developed over the years that measure aspects of adhesion (1-5). There generally is difficulty, however, in relating these tests to basic adhesion phenomena.

#### X1.3 The Tape Test

X1.3.1 By far the most prevalent test for evaluating coating “adhesion” is the tape-and-peel test, which has been used since the 1930’s. In its simplest version a piece of adhesive tape is pressed against the paint film and the resistance to and degree

of film removal observed when the tape is pulled off. Since an intact film with appreciable adhesion is frequently not removed at all, the severity of the test is usually enhanced by cutting into the film a figure X or a cross hatched pattern, before applying and removing the tape. Adhesion is then rated by comparing film removed against an established rating scale. If an intact film is peeled cleanly by the tape, or if it debonds just by cutting into it without applying tape, then the adhesion is rated simply as poor or very poor, a more precise evaluation of such films not being within the capability of this test.

X1.3.2 The current widely-used version was first published in 1974; two test methods are covered in this standard. Both test methods are used to establish whether the adhesion of a coating to a substrate is at an adequate level; however they do not distinguish between higher levels of adhesion for which more sophisticated methods of measurement are required. Major limitations of the tape test are its low sensitivity, applicability only to coatings of relatively low bond strengths, and non-determination of adhesion to the substrate where failure occurs within a single coat, as when testing primers alone, or within or between coats in multicoat systems. For multicoat systems where adhesion failure may occur between or within coats, the adhesion of the coating system to the substrate is not determined.

X1.3.3 Repeatability within one rating unit is generally observed for coatings on metals for both methods, with reproducibility of one to two units. The tape test enjoys widespread popularity and is viewed as “simple” as well as low in cost. Applied to metals, it is economical to perform, lends itself to job site application, and most importantly, after decades of use, people feel comfortable with it.

X1.3.4 When a flexible adhesive tape is applied to a coated rigid substrate surface and then removed, the removal process has been described in terms of the “peel phenomenon,” as illustrated in Fig. X1.1.

X1.3.5 Peeling begins at the “toothed” leading edge (at the right) and proceeds along the coating adhesive/interface or the coating/substrate interface, depending on the relative bond strengths. It is assumed that coating removal occurs when the tensile force generated along the latter interface, which is a function of the rheological properties of the backing and adhesive layer materials, is greater than the bond strength at the coating-substrate interface (or cohesive strength of the coating). In actuality, however, this force is distributed over a discrete distance (O-A) in Fig. X1.1, which relates directly to the properties described, not concentrated at a point (O) in Fig. X1.1 as in the theoretical case—though the tensile force is greatest at the origin for both. A significant compressive force arises from the response of the tape backing material to being stretched. Thus both tensile and compressive forces are involved in adhesion tape testing.

X1.3.6 Close scrutiny of the tape test with respect to the

<sup>12</sup> The boldface numbers in parentheses refer to the list of references at the end of this test method.



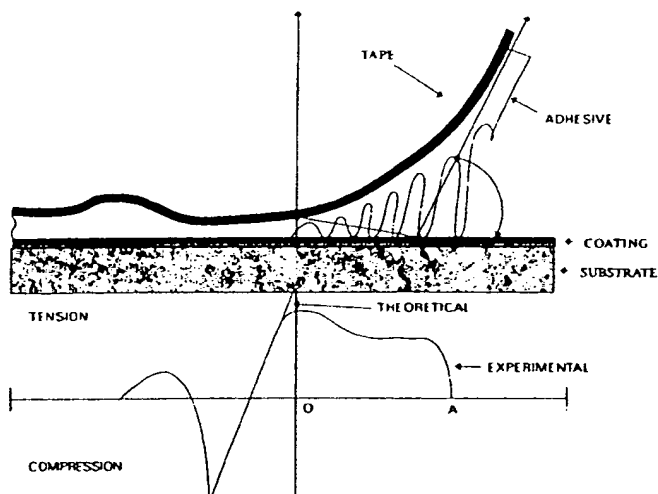


FIG. X1.1 Peel Profile (6)

nature of the tape employed and certain aspects of the procedure itself reveal several factors, each or any combination of which can dramatically affect the results of the test as discussed (6).

#### X1.4 Peel Adhesion Testing on Plastic Substrates

X1.4.1 Tape tests have been criticized when used for substrates other than metal, such as plastics. The central issues are that the test on plastics lacks reproducibility and does not relate to the intended application. Both concerns are well founded: poor precision is a direct result of several factors intrinsic to the materials employed and the procedure itself. More importantly, in this instance the test is being applied beyond its intended scope. These test methods were designed for relatively ductile coatings applied to metal substrates, not for coatings (often brittle) applied to plastic parts (7). The unique functional requirements of coatings on plastic substrates cause the usual tape tests to be unsatisfactory for measuring adhesion performance in practice.

#### X1.5 The Tape Controversy

X1.5.1 With the withdrawal from commerce of the tape specified originally, 3M No. 710, current test methods no longer identify a specific tape. Differences in tapes used can lead to different results as small changes in backing stiffness and adhesive rheology cause large changes in the tension area. Some commercial tapes are manufactured to meet minimum standards. A given lot may surpass these standards and thus be suitable for general market distribution; however, such a lot may be a source of serious and unexpected error in assessing adhesion. One commercially available tape test kit had included a tape with adhesion strength variations of up to 50 % claimed by the manufacturer. Also, because tapes change on storage, bond strengths of the tape may change over time (7, 8).

X1.5.2 While there are tapes available that appear to deliver consistent performance, a given tape does not adhere equally well to all coatings. For example, when the peel removal force of the tape (from the coating) used earlier by Task Group D01.23.10 to establish precision of the method, by 3M No. 710 was examined with seven different electromagnetic

interference/radio frequency interference (EMI/RFI) coatings, it was found that, while peel was indeed consistent for a given coating, the value varied by 25 % between the highest and lowest ratings among coatings. Several factors that contribute to these differences include coating composition and topology: as a result, no single tape is likely to be suitable for testing all coatings. Further, the tape test does not give an absolute value for the force required for bond rupture, but serves only as an indicator that some minimum value for bond strength was met or exceeded (7, 8).

#### X1.6 Procedural Problems

X1.6.1 The tape test is operator intensive. By design it was made as simple as possible to perform, and requires a minimum of specialized equipment and materials that must meet certain specifications. The accuracy and precision depend largely upon the skill of the operator and the operator's ability to perform the test in a consistent manner. Key steps that directly reflect the importance of operator skill include the angle and rate of tape removal and the visual assessment of the tested sample. It is not unexpected that different operators might obtain different results (7, 8).

##### X1.6.2 Peel Angle and Rate:

The standard requires that the free end of the tape be removed rapidly at as close to a 180° angle as possible. If the peel angle and rate vary, the force required to remove the tape can change dramatically. Nearly linear increases were observed in peel force approaching 100 % as peel angle was changed from 135 to 180, and similar large differences can be expected in peel force as peel rate varies. These effects are related as they reflect certain rheological properties of the backing and adhesive that are molecular in origin. Variation in pull rate and peel angle can effect large differences in test values and must be minimized to assure reproducibility (9).

##### X1.6.3 Visual Assessment:

The final step in the test is visual assessment of the coating removed from the specimen, which is subjective in nature, so that the coatings can vary among individuals evaluating the same specimen (9).

X1.6.3.1 Performance in the tape test is based on the amount of coating removed compared to a descriptive scale. The exposure of the substrate can be due to factors other than coating adhesion, including that arising from the requirement that the coating be cut (hence the synonym "cross-hatch adhesion test"). Justification for the cutting step is reasonable as cutting provides a free edge from which peeling can begin without having to overcome the cohesive strength of the coating layer.

X1.6.3.2 Cutting might be suitable for coatings applied to metal substrates, but for coatings applied to plastics or wood, the process can lead to a misleading indication of poor adhesion due to the unique interfacial zone. For coatings on soft substrates, issues include how deep should this cut penetrate, and is it possible to cut only to the interface?

X1.6.3.3 In general, if adhesion test panels are examined microscopically, it is often clearly evident that the coating removal results from substrate failure at or below the interface, and not from the adhesive failure between the coating and the substrate. Cohesive failure within the coating film is also



frequently observed. However, with the tape test, failures within the substrate or coating layers are rare because the tape adhesive is not usually strong enough to exceed the cohesive strengths of normal substrates and organic coatings. Although some rather brittle coatings may exhibit cohesive failure, the tape test adhesion method does not make provision for giving failure locality (7, 8).

X1.6.4 Use of the test method in the field can lead to

variation in test results due to temperature and humidity changes and their effect upon tape, coating and substrate.

## X1.7 Conclusion

X1.7.1 All the issues aside, if these test methods are used within the Scope Section and are performed carefully, some insight into the approximate, relative level of adhesion can be gained.

## REFERENCES

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- (2) Corcoran, E. M., "Adhesion," Chapter 5.3, *Paint Testing Manual*, 13th ed., *ASTM STP 500*, ASTM, 1972, pp. 314-332.
- (3) Gardner, H. A., and Sward, G. G., *Paint Testing Manual*, 12th ed., Chapter 7, Gardner Laboratory, Bethesda, MD, 1962, pp. 159-170.
- (4) Mittal, K. L., *Journal of Adhesion Science and Technology*, Vol 1, No. 3, 1987, pp. 247-259.
- (5) Stoffer, J. O., and Gadodia, S. K., *American Paint and Coatings Journal*, Vol 70, Nos. 50 and 51, 1991, pp. 36-40 and 36-51, respectively.
- (6) Souheng, Wu, *Polymer Interface and Adhesion*, Marcel Dekker, Inc., New York, NY, 1982, p. 531.
- (7) Nelson, G. L., Gray, K. N., and Buckley, S. E., *Modern Paint and Coatings*, Vol 75, No. 10, 1985, pp. 160-172.
- (8) Nelson, G. L., and Gray, K. N., "Coating Adhesion to Plastics," *Proceedings, Waterborne and Higher Solids Coatings Symposium*, Vol 13, New Orleans, LA, February 5-7, 1986, pp. 114-131.
- (9) K. L. Mittal, ed., "Symposium on Adhesion Aspects of Polymeric Coatings," *Proceedings*, The Electrochemical Society, 1981, pp. 569-582.

## SUMMARY OF CHANGES

Committee D01 has identified the location of selected changes to this standard since the last issue (D 3359 - 97) that may impact the use of this standard.

- |  |  |
|--|--|
| <p>(1) Deleted reference to Test Method D 2197 in Referenced Documents section and editorially changed footnote 10 to avoid confusion with another adhesion test method.</p> | <p>(2) Added 7.1.1, 8.5, 12.1.1, and 13.4 to clarify use when testing samples that have been immersed.</p> |
|--|--|

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FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches  
5.00 inches

Solution Identity:

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
48.80	10.00	-1-2-320		43.920	4.880	48.800	1.321	146.782	148.103
0.00	0.00	-2-		0.000	0.000	0.000	0.000	0.000	0.000
49.00	0.00	-3- Water		49.000	0.000	49.000	1.474	0.000	1.474
1.70	5.00	-4- APG325		1.615	0.085	1.700	0.049	2.557	2.605
0.22	10.00	-5- Olin 10G		0.198	0.022	0.220	0.006	0.662	0.668
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
99.720				94.733	4.987	99.720	2.849	150.000	152.849

The calculated dry weight of the batch is: 4.99 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~5.008~~ → 2.5 %

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1349.73

g

CE Romanoff  
Shirley A. Shallen 11-21-01



Example 2

FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: **18**

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
48.80	10.00	-1-2-210		43.920	4.880	48.800	1.321	146.782	148.103
0.00	0.00	-2-		0.000	0.000	0.000	0.000	0.000	0.000
49.00	0.00	-3- Water		49.000	0.000	49.000	1.474	0.000	1.474
1.70	5.00	-4- APG325		1.615	0.085	1.700	0.049	2.557	2.605
0.22	10.00	-5- 0lin 10G		0.198	0.022	0.220	0.006	0.662	0.668
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
99.720				94.733	4.987	99.720	2.849	150.000	152.849

The calculated dry weight of the batch is: 4.99 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is: ~~5.008~~ → **2.5 %**

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"-> 0.150 g/ft2

COATED FOOTAGE: 800.00 ft

TOTAL SOLUTION NEEDED:

1349.73 g

*Shirley A. Dodder 11-21-01*



# Example 3

## FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

4.50 inches

Support Width:

5.00 inches

Solution Identity: 14

for 8-8-01

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210		33.750	3.750	37.500	0.989	109.928	110.917
3.60	35.00	-2-Witcobond 253		2.340	1.260	3.600	0.069	36.936	37.004
59.40	0.00	-3-Water		59.400	0.000	59.400	1.741	0.000	1.741
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5-01in 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.420				97.303	5.117	102.420	2.852	150.000	152.852

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~5.00%~~ → 2.5%

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1351.06

g

CS (Thompson)

Shirley A. Padden 11-21-01



Example 4

FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Solution Identity: 8

Support Type: Coated Width: 4.50 inches  
Support Width: 5.00 inches

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210		33.750	3.750	37.500	0.989	109.928	110.917
4.20	30.00	-2-Morcy1 132		2.940	1.260	4.200	0.086	36.936	37.022
59.00	0.00	-3-Water		59.000	0.000	59.000	1.730	0.000	1.730
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5-011n 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.620				97.503	5.117	102.620	2.858	150.000	152.858

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is:

~~1.998~~ → 2.5 %

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->

0.150 g/ft2

COATED FOOTAGE:

800.00 ft

TOTAL SOLUTION NEEDED:

1353.69 g

CE fromano

Anita A. Dooler 11-21-01



A

8-8-01

(Interlayer)

comment to  
writer  
9-11-01

Elvanol 52-22  $\Rightarrow$  867g  
Witibond 232  $\Rightarrow$  104.1g  
Water  $\Rightarrow$  1,729.5g

Active  
86.7g 28%  
31.23 35%  
 $\sim 40g$  dry

$\sim 2.3\%$  solids

CE Romano  
Shiela A. Sadler 11-2-01



FORMULA CONVERSION PROGRAM - G/FT2

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Coated Width:	4.50 inches
Support Width:	5.00 inches

10-8-08

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label
4. Enter dry coverage in cell "G37"

#1 REMAKE

Amount  
75.90  
12.5  
310.2  
41.2  
0.47

Gms.

ENTER THE VA OF THE SOLUTION->  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

25%

8/10/5 = 2.5%

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->

0.150

$$g/ft^2$$

COATED FOOTAGE:

800.00

ח  
ה

✓ FETAL SOLUTION NEEDED:

1350.40

৫

Theresa A. Dooley 11-21-01



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: 2

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chemical unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	1-2-210	BAEMN	3.750	3.750	37.500	0.991	110.143	111.134
12.50	10.00	2-BAEMN	Water	1.250	1.250	12.500	0.330	36.714	37.045
50.00	0.00	3-Water	APG325	50.000	0.000	50.000	1.469	0.000	1.469
1.70	10.00	4-APG325	PVA	1.615	0.085	1.700	0.047	2.497	2.544
0.22	0.00	5-011n	10g	0.198	0.022	0.220	0.006	0.646	0.652
0.00	0.00	6-		0.000	0.000	0.000	0.000	0.000	0.000
101.920				96.813	5.107	101.920	2.844	150.000	152.844

The calculated dry weight of the batch is: 5.11

ENTER THE VA OF THE SOLUTION-> 1.005

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.5%

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"-> 0.150

COATED FOOTAGE: 800.00

TOTAL SOLUTION NEEDED: 1347.09

Shirley A. Darden 11-21-01

Standard Order  
Water } mix  
PVA }  
Additive }  
Surfactant }



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: 3

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210		33.750	3.750	37.500	0.991	110.115	111.106
12.90	9.70	-2-Aem		11.649	1.251	12.900	0.342	36.743	37.085
50.00	0.00	-3-Water		50.000	0.000	50.000	1.468	0.000	1.468
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.496	2.543
0.22	10.00	-5-01in 10G		0.198	0.022	0.220	0.006	0.646	0.652
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.320				97.212	5.108	102.320	2.855	150.000	152.855
The calculated dry weight of the batch is:				5.11		Gms.			
ENTER THE VA OF THE SOLUTION->				1.005					
ENTER SPECIFIC GRAVITY OF THE SOLUTION->									
The calculated solids of this batch is:				2.5%					
ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->				0.150		g/ft2			
COATED FOOTAGE:				800.00		ft			
TOTAL SOLUTION NEEDED:				1352.03		g			

TOTAL SOLUTION NEEDED:

800.00 ft

0.150 g/ft2

2.5%

1352.03 g

CE Roman &  
Shirley A. Dooler 11-21-01



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support type:

Coated Width:

Support Width:

4.50 inches  
5.00 inches

Solution Identity: 4

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210		37.750	3.750	37.500	0.989	109.928	110.917
3.00	42.00	-2-Glascol C44		1.740	1.260	3.000	0.051	36.936	36.987
60.00	0.00	-3-Water		60.000	0.000	60.000	1.759	0.000	1.759
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5-Olin 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.420				97.303	5.117	102.420	2.852	150.000	152.852

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

5.008

Diluted to 2.5%

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1351.06

g

CE Form 11-21-01

Shirley A. Decker 11-21-01



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: 5

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-	Z-210	33.750	3.750	37.500	0.989	109.928	110.917
3.50	36.00	-2-	Glascot RP3	2.240	1.260	3.500	0.066	36.936	37.001
59.00	0.00	-3-	Water	59.000	0.000	59.000	1.730	0.000	1.730
1.70	5.00	-4-	APG325	1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5-	01in 10G	0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
101.920				96.803	5.117	101.920	2.838	150.000	152.838

The calculated dry weight of the batch is:

5.12 Gms.

ENTER THE VA OF THE SOLUTION->  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~5.020~~ → 2.5%

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->

0.150 g/ft2

COATED FOOTAGE:

800.00 ft

TOTAL SOLUTION NEEDED:

1344.46 g

CE Remedy

Shela A. Sadler 11-21-01



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: 6

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1- Z-210		33.750	3.750	37.500	0.989	109.928	110.917
3.60	35.00	-2- Glascol RP4		2.340	1.260	3.600	0.069	36.936	37.004
59.00	0.00	-3- Water		59.000	0.000	59.000	1.730	0.000	1.730
1.70	5.00	-4- APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5- Ol in 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.020				96.903	5.117	102.020	2.841	150.000	152.841

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is:

~~5.028~~ → 2.5%

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150 g/ft2

COATED FOOTAGE:

800.00 ft

TOTAL SOLUTION NEEDED:

1345.78 g

CE Formano  
Shirley A. Sadler 11-21-01



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches

5.00 inches

Solution Identity: 7

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMT # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1- 2-210		33.750	3.750	37.500	0.992	110.186	111.178
2.60	48.00	-2- Lucidene 243		1.352	1.248	2.600	0.040	36.670	36.710
60.00	0.00	-3- Water		60.000	0.000	60.000	1.763	0.000	1.763
1.70	5.00	-4- AFG325		1.615	0.085	1.700	0.047	2.498	2.545
0.22	10.00	-5- 01in 10G		0.198	0.022	0.220	0.006	0.646	0.652
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.020				96.915	5.105	102.020	2.848	150.000	152.848

The calculated dry weight of the batch is: 5.11 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~5.000~~ → 2.5 %

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1348.94

g

CE Formanoff

Shila A. Seidler 11-21-01



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches

5.00 inches

Solution Identity: 9

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EX/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210		33.750	3.750	37.500	0.989	109.928	110.917
4.20	30.00	-2-U710		2.940	1.260	4.200	0.086	36.936	37.022
59.00	0.00	-3-Water		59.000	0.000	59.000	1.730	0.000	1.730
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5-0lin 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.620				97.503	5.117	102.620	2.858	150.000	152.858

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~1.998~~ → 2.5 %

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150 g/ft2

COATED FOOTAGE:

800.00 ft

TOTAL SOLUTION NEEDED:

1353.69 g

CSFomansky.

Shirley A. Sadler 11-21-01



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches

5.00 inches

Solution Identity: 10

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1- Z-210		33.750	3.750	37.500	0.993	110.359	111.352
3.10	40.00	-2- U410		1.860	1.240	3.100	0.055	36.492	36.547
59.40	0.00	-3- Water		59.000	0.000	59.000	1.736	0.000	1.736
1.70	5.00	-4- APG325		1.615	0.085	1.700	0.048	2.501	2.549
0.22	10.00	-5- Olin 10G		0.198	0.022	0.220	0.006	0.647	0.653
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
101.820				96.423	5.097	101.520	2.838	150.000	152.838

The calculated dry weight of the batch is:

5.10

Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

5.026

2.5%

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1344.44

g

CELEBRANDO  
Shelia A. Wheeler 11-21-01



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: 11

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1-2-210	5-11-01	33.750	3.750	37.500	0.991	110.057	111.047
2.85	44.00	-2-AC2538		1.596	1.254	2.850	0.047	36.803	36.850
60.00	0.00	-3-Water		60.000	0.000	60.000	1.761	0.000	1.761
1.70	5.00	-4-APG325		1.615	0.085	1.700	0.047	2.495	2.542
0.22	10.00	-5-Olin 10G		0.198	0.022	0.220	0.006	0.646	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.270				97.159	5.111	102.270	2.851	150.000	152.851

The calculated dry weight of the batch is: 5.11 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is: 5.000 -> 2.52

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"-> 0.150 g/ft2

COATED FOOTAGE: 800.00 ft

TOTAL SOLUTION NEEDED: 1350.66 g

\* Catrans strings/slugs

pre filtered 5 ft mesh  
cheese cloth  
before adding

CELESTANO

Shirley A. Decker 11-21-01



FORMULA CONVERSION PROGRAM - G/FT2

```
1. solution identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"
```

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:	4.50 inches
Support Width:	5.00 inches

Solution Identity: 12

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft <sup>2</sup>	Dry g/ft <sup>2</sup>	Total g/ft <sup>2</sup>
37.50	10.00	-1	Z-210	33.750	3.750	37.500	0.989	109.928	110.917
3.60	35.00	-2	UCX 01-011	2.340	1.260	3.600	0.069	36.936	37.004
59.40	0.00	-3	Water	59.400	0.000	59.400	1.741	0.000	1.741
1.70	5.00	-4	APG325	1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5	Olfin 10G	0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6		0.000	0.000	0.000	0.000	0.000	0.000
102.420				97.303	5.117	102.420	2.852	150.000	152.852

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION->  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is:

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"->

COATED FOOTAGE:

TOTAL SOLUTION NEEDED:

1351.06

10

TOTAL POLYMERIZATION NEEDED: + + + + +  
 C. E. Martin + + + + +  
 Sheila A. Gooden 11-21-70

~~30~~  
~~7.5g/ft<sup>2</sup>~~  
~~800-1000 ft~~  
~~300 ft~~  
~~40 g~~  
~~30 g~~  
~~40 g~~



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches  
5.00 inches

Solution Identity: 13

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1- 2-210		3.750	3.750	37.500	0.989	109.928	110.917
3.60	35.00	-2- UCX 99-027	Must Seal	2.340	1.260	3.600	0.069	36.936	37.004
59.40	0.00	-3- Water		59.400	0.000	59.400	1.741	0.000	1.741
1.70	5.00	-4- APG325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5- Olin 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.420				97.303	5.117	102.420	2.852	150.000	152.852

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is: 5.00% → 2.5%

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"-> 0.150 g/ft2

COATED FOOTAGE: 800.00 ft

TOTAL SOLUTION NEEDED: 1351.06 g

Shirley A. Decker 11-21-01



Melt 15 for Wed 8/8/01

(g) % Solids

• 37.50 10 Z 210

• 4.20 30 WD 30

• 59.0 0 Water

1.70 5 APC 325

0.22 10 D/L 10G

102.620

204 g @ 2.5%

CE Donald

Shela A. Stoller 11-21-01



# FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches

5.00 inches

Solution Identity: *16*

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMT # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
37.50	10.00	-1- 2-210		33.750	3.750	37.500	0.989	109.928	110.917
4.20	30.00	-2- DP6-7133		2.940	1.260	4.200	0.086	36.936	37.022
59.00	0.00	-3- Water		59.000	0.000	59.000	1.730	0.000	1.730
1.70	5.00	-4- APG 325		1.615	0.085	1.700	0.047	2.492	2.539
0.22	10.00	-5- Olm 10G		0.198	0.022	0.220	0.006	0.645	0.651
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.620				97.503	5.117	102.620	2.858	150.000	152.858

The calculated dry weight of the batch is: 5.12 Gms.

ENTER THE VA OF THE SOLUTION->

ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~4.998~~ → 2.5 %

ENTER THE DRY COVERAGE IF THE

SOLUTION IS NOT COATED TO A "VA"->

0.150 g/ft2

COATED FOOTAGE:

800.00 ft

TOTAL SOLUTION NEEDED:

1353.69 g

*Certified*  
*Shirley A. Sadler 11-21-09*



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width:

Support Width:

4.50 inches  
5.00 inches

Solution Identity: *17*

*for 8-8-01*

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
0.00	0.00	-1-		0.000	0.000	0.000	0.000	0.000	0.000
17.00	30.00	-2-	DP6-7133	11.900	5.100	17.000	0.343	146.918	147.260
85.00	0.00	-3-	Water	85.000	0.000	85.000	2.449	0.000	2.449
1.70	5.00	-4-	APG 325	1.615	0.085	1.700	0.047	2.449	2.495
0.22	10.00	-5-	Ol in 10G	0.198	0.022	0.220	0.006	0.634	0.639
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
103.920				98.713	5.207	103.920	2.844	150.000	152.844

The calculated dry weight of the batch is:

5.21

Gms.

ENTER THE VA OF THE SOLUTION->  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

1.005

The calculated solids of this batch is:

~~5.018~~ → **2.5 %**

ENTER THE DRY COVERAGE IF THE  
SOLUTION IS NOT COATED TO A "VA"->

0.150

g/ft2

COATED FOOTAGE:

800.00

ft

TOTAL SOLUTION NEEDED:

1347.15

g

*C. E. Howard*

*Shield A. Dasher 11-21-01*



FORMULA CONVERSION PROGRAM - G/FT2

ENTER THE FOLLOWING REQUIRED MASTER DATA INFORMATION:

1. Solution Identity -> cell "D11"
3. Coated Width (xx.xx) -> cell "I9"
4. Support Width (xx.xx) -> cell "I10"

Support Type:

Coated Width: 4.50 inches  
Support Width: 5.00 inches

Solution Identity: **19**

ENTER THE FOLLOWING DATA TO PERFORM GMS/FT2 CALCULATIONS:

1. Total weight of each chemical.
2. % Solids (xx.xxx) of each chemical; Dry chems=100 unless known.
3. Chemical Identification (EK/RMI # if possible) entered as a label.
4. Enter dry coverage in cell "G37"

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	Total Weight	Wet g/ft2	Dry g/ft2	Total g/ft2
50.15	10.00	-1- 2-200		43.920	4.880	48.800	1.321	146.782	148.103
0.00	0.00	-2-		0.000	0.000	0.000	0.000	0.000	0.000
50.35	0.00	-3- Water		49.000	0.000	49.000	1.474	0.000	1.474
1.75	5.00	-4- APG325		1.615	0.085	1.700	0.049	2.557	2.605
0.23	10.00	-5- Olin 10G		0.198	0.022	0.220	0.006	0.662	0.668
0.00	0.00	-6-		0.000	0.000	0.000	0.000	0.000	0.000
102.47				94.733	4.987	99.720	2.849	150.000	152.849
99.720									

The calculated dry weight of the batch is: 4.99 Gms.

ENTER THE VA OF THE SOLUTION-> 1.005  
ENTER SPECIFIC GRAVITY OF THE SOLUTION->

The calculated solids of this batch is:

~~5.00%~~ → **2.5 %**

ENTER THE DRY COVERAGE IF THE SOLUTION IS NOT COATED TO A "VA"-> 0.150 g/ft2

COATED FOOTAGE: 800.00 ft

TOTAL SOLUTION NEEDED: 1349.73 g

*CE from 11/21-01*  
*Shirley A. Soder*



Melt 21 5% OKS-3431

for 8-8-01

~~44241~~ 61.00 <sup>OK</sup> Solids 8% OKS 3431

- 36.78 Water

1.70 5% APG 325

0.22 10% 81.5 10G

+ DIF ↓

200g @ 2.5% Solids

Trans

CEPomacOz

Shula a dobler 11-21-01



Melt 22

5% OKS-3432

for SSC 8/8/01

• 61.00 8% OKS-3432

• 36.78 water

1.70 5% APG 325

0.22 10% 0/in 10G

↓ DS

200g @ 2.5% solids

CEPomany

Shela D. Sadler 11-21-01



Attachment C-3

SCS-0927

SC-5 COATING REQUEST

Coating Sheet 1

Conditions	DB	DP	Pres	Ft	Originator	C Romano/ K Maskasky	Support:	RC paper	Coated by:
Setting Sect.	40	26	0.3	39	UserID	L125610 / L594389			Date: 26-Jul-01
Dryer No. 1	120	40	1	32	Phone	x23004 / x77880			Page Witnessed by
Dryer No. 2	120	50	2	38	Prob. #	0700-03058			

Part ID	SLOT	Melt #	Slide	Melt Vol.	% solids	ml/ft2	Pump RPM	Cig. spd	Melt Experiment	Laydown (mg/ft2)	Linear Feet	Notes
1	1	OC	100	800	2%	5.0	67.3	12	Galaxy OC	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
2	2	OC	100		2%	5.0	67.3	12	Alcotex 864	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
3	3	OC	100		2%	5.0	67.3	12	QP300	100	12	Control Example 1
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
4	4	OC	100		2%	5.0	67.3	12	K100	100	12	Control Example 2
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
5	5	OC	100		2%	5.0	67.3	12	A15	100	12	Control Example 3
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
6	6	OC	100		2%	5.0	67.3	12	F4M	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
7	7	OC	100		2%	5.0	67.3	12	CMC	100	12	Control Example 4
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
8	8	OC	100		2%	5.0	67.3	12	Airvam	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
9	9	OC	100		2%	5.0	67.3	12	K35LV	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
10	10	OC	100		2%	5.0	67.3	12	Aquazol 5	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
11	11	OC	100		2%	5.0	67.3	12	Aquazol 50	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
12	12	IL	100		2%	5.0	67.3	12	Aquazol 200	100	12	
	A	BL		800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
13	13	IL	100		2%	5.0	67.3	12	Aquazol 500	100	12	



14	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	14	IL	100	2%	5.0	67.3	12	AH-17	100	12	
15	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	15	IL	100	2%	5.0	67.3	12	AH-26	100	12	
16	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	16	IL	100	2%	5.0	67.3	12	GH-23	100	12	
17	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	17	IL	100	2%	5.0	67.3	12	GL-05	100	12	
18	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	18	IL	100	2%	5.0	67.3	12	K-210	100	12	
19	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	19	IL	100	2%	5.0	67.3	12	KH-17	100	12	
20	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	20	IL	100	2%	5.0	67.3	12	KH-20	100	12	
21	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	21	IL	100	2%	5.0	67.3	12	KP-06	100	12	
22	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	22	IL	100	2%	5.0	67.3	12	KP-08	100	12	
23	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	23	IL	100	2%	5.0	67.3	12	Z320	100	12	
24	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	24	IL	100	2%	5.0	67.3	12	N-300	100	12	
25	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	25	IL	100	2%	5.0	67.3	12	T-215	100	12	
26	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	26	IL	100	2%	5.0	67.3	12	WO320	100	12	
27	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	27	IL	100	2%	5.0	67.3	12	Z-100	100	12	
28	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	28	IL	100	2%	5.0	67.3	12	Z-210	100	12	
29	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	29	IL	100	2%	5.0	67.3	12	Alcotex 552P	100	12	
Toxic ?:	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
	A	BL	800	5%	3.0	40.4	12	Elvanol 52-22/Wcb 232 (77/23)	150	12	
Special Instructions:											
Melt											
Melts @104°F											
Jacketed hopper @104°F											

Control Example 6

Control Example 5



No

X

Stir

yes

Suction ??

Handroll:



Attachment C-4

Low Melt Gloss (08-08 ProLustre ProLustre Low Melt Gloss (08-09  
 EK3043 EK3044 EK3043 EK3044 Encad 700 Encad 700  
 00% CMY120% CMY100% CMY120% CMY100% CMY120% CMY1

ID	(0936-1 RL	IL	OC	5	4						
Galaxy				5	4						
Arkwright				3	3					5	3
Encad QIS				303	211						
Rexam LG											
Rexam Mug-7											
HP Photo											
0947-1	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/POL-4455	162	1	1	2	227	77		
0947-2	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/BAeMn	73	117	2	2	656	248		
0947-3	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/AeMn	610	566	1	1	863	489		
0947-4	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot C44	135	164	2	1	429	177		
0947-5	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot RP3	0	0	2	3	372	47		
0947-6	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot RP4	0	0	3	2	427	101		
0947-7	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Lucidene 243	67	2	4	2	309	42		
0947-8	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Moreryl 132	0	0	3	2	381	283		
0947-9	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/U710	146	95	4	4	224	80		
0947-10	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/U410	0	0	4	3	81	36		
0947-11	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/AC-2538	3	120	4	2	363	181		
0947-12	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/UCX 01-011	171	118	4	4	355	173		
0947-13	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/UCX 99-027	126	59	4	4	242	53		
0947-14	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Wicobond 253	164	128	3	3	435	82		
0947-15	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/WD30	0	0	4	3				
0947-16	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/DP6-7133	0	0	2	1				
0947-17	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	DP6-7133	0	0	2	1				
0947-18	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210	285	452			445	154		
0947-19	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-200	629	671	3	1	333	64		
0947-20	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-320	829	480	3	1	620	385		
0947-21	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	OKS-3431	234	110	3	3	102	62		
0947-22	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	OKS-3432	188	172	3	3	127			
0947-23	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Galaxy OC	0	0	3	1				
0947-24	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/POL-4455	0	0	1	1				
0947-25	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/POL-4455	0	0	3	1				

Ex 1-1  
 Ex 2-1  
 Ex 3-1  
 Ex 4-1

VE  
 G  
 E





[illegible]



ID (0936-1 Rt

IL

OC

Low Melt Gloss (08-08 ProLustre ProLustre Low Melt Gloss (08-09  
EK3043 EK3044 EK3043 EK3044 Encad 700 Encad 700  
00% CMY120% CMY100% CMY120% CMY100% CMY120% CMY1

Galaxy				5	4				5	3
Arkwright				3	3				5	3
Encad QIS				303	211					
Rexam LG										
Rexam Mug-7										
HP Photo										
0947-1	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/POL-4455	162	1	1	2	227	77	
0947-2	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/BaEMn	73	117	2	2	656	248	
0947-3	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/AeMn	610	566	1	1	863	489	
0947-4	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot C44	135	164	2	1	429	177	
0947-5	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot RP3	0	0	2	3	372	47	
0947-6	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Glascot RP4	0	0	3	2	427	101	
0947-7	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Lucidene 243	67	2	4	2	309	42	
0947-8	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Morcy1132	0	0	3	2	381	283	
0947-9	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/U710	146	95	4	4	224	80	
0947-10	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/U410	0	0	4	3	81	36	
0947-11	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/AC-2538	3	120	4	2	363	181	
0947-12	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/UCX 01-011	171	118	4	4	355	173	
0947-13	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/UCX 99-027	126	59	4	4	242	53	
0947-14	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/Wicobond 253	164	128	3	3	435	82	
0947-15	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/W/D30	0	0	4	3			
0947-16	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210/DP6-7133	0	0	2	1			
0947-17	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	DP6-7133	0	0	2	1			
0947-18	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210	285	452			445	154	
0947-19	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-200	629	671	3	1	333	64	
0947-20	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-320	829	480	3	1	620	385	
0947-21	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	OKS-3431	234	110	3	3	102	62	
0947-22	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	OKS-3432	188	172	3	3	127		
0947-23	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Galaxy OC	0	0	3	1			
0947-24	Gel 7869		Z-210/POL-4455	0	0	1	1			
0947-25	Gel 7869		Z-210/POL-4455	0	0	3	1			



ID	BL	IL	OC	ProLustre	LMG	LMG	LMG	LMG	LMG
HP Photo				Encad 700	Encad 700	Encad 700	Encad 700	Encad 700	Encad 700
0927-1	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Galaxy OC	230	77	38	>>	32	322
0927-2	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Alcotex 864			215		34	
0927-3	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	QP300			-	0		(12)
0927-4	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	K100			-	0		(32)
0927-5	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	A15			-	0		(37)
0927-6	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	F4M			-			
0927-7	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	CMC			-			
0927-8	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Altram			-	3		(18)
0927-9	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	K35LV			-		-	
0927-10	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Aquazol 5			-			
0927-11	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Aquazol 50			27			
0927-12	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Aquazol 200	114	157	296		10	
0927-13	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Aquazol 500	327	170	276	170*	22	166
0927-14	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	AH-17			-			
0927-15	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	AH-26			-			
0927-16	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	GH-23			-			
0927-17	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	GL-05			-	368		(52)
0927-18	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	K-210			-			
0927-19	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	KH-17			-			
0927-20	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	KH-20			-			
0927-21	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	KP-06			-			
0927-22	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	KP-08			-			
0927-23	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z320	93	-	1151		591	
0927-24	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	N-300			-			
0927-25	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	T-215			-			
0927-26	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	WO320	47	-	-	572	-	(50)
0927-27	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-100	221	-	207		87	
0927-28	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Z-210	68	-	1248		281	
0927-29	Gel 7869	Elvanol 52-22/Wcb 232 (77/23)	Alcotex 552P	x	x	x	x	x	x



Pro Luster (08-09-0	Pro Luster (08-09-0	Low Melt Gloss	Pro Luster
Encad 700	Encad 700	HP 5000	HP 5000
00% CMY120% CMY100%	00% CMY120% CMY100%	CMY120% CMY100%	CMY120% CMY1
ID	ID	ID	ID

[illegible]



[illegible]

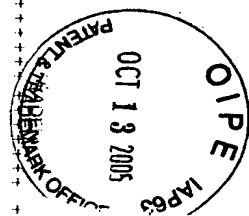


# Attachment D-1

Example	Surfactant	Immediately After Laminating	30 Hrs After Laminating	66 Hrs After Laminating	Coating Quality
		Peel Force (lbs/inch)	Peel Force (lbs/inch)	Peel Force (lbs/inch)	
Example 1	Yes	0.535	1.876	3.433	Good
Example 2	Yes	0.687	2.568	Paper Split	Fair/Good
Example 3	Yes	0.425	2.569	4.274	Good
Example 4	Yes	0.652	1.479	Paper Split	Fair/Good
Control Example 1	Yes	0.061	0.062	0.060	Good
Control Example 2	Yes	0.059	0.050	0.086	Good
Control Example 3	Yes	0.073	0.187	0.093	Fair/Good
Control Example 4	Yes	0.040	0.039	0.069	Very Poor
Control Example 5	Yes	0.044	0.034	0.037	Good
Control Example 6	Yes	0.025	0.060	0.049	Good
Example 5	No	1.265	3.199	Paper Split	Fair/Good
Example 6	No	0.120	0.370	0.999	Fair
Example 7	No	0.168	0.641	Paper Split	Poor
Example 8	No	0.088	0.993	Paper Split	Fair/Good
Control Example 7	No	0.010	0.041	0.037	Poor
Control Example 8	No	0.128	0.035	0.170	Poor
Control Example 9	No	0.098	0.038	0.059	Very Poor
Control Example 10	No	0.016	0.024	0.028	Very Poor
Control Example 11	No	0.010	0.014	0.025	Fair/Good
Control Example 12	No	0.008	0.011	0.015	Good

Charles E. Hemans Jr. 2-24-05  
 Ken Haskins by 2-24-05





Attachment D-2

(02/14/05)

Solution OC-01 Z-320 Acetoacetylated PVA

Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width:

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
8.76	38.76	-1-	Z-320 Acac-PVA	34.88	3.876	96.90%	38.76	872.14	96.90	969.05
0.00	0.00	-2-	Water	160.00	0.000	0.00%	160.00	4000.56	0.00	4000.56
0.96	10.00	-3-	APG 325N	0.86	0.096	2.40%	0.96	21.60	2.40	24.00
0.28	10.00	-3-	Qlin 10C	0.25	0.028	0.70%	0.28	6.26	0.70	6.95
0.28	200.00									
196.00	4.00					100.0%	200.00	4900.56	100.00	5000.56

The calculated dry weight of the batch is: 4.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 40.00 ft2

COATED FOOTAGE: 50.00

TOTAL SOLUTION NEEDED: 190.64

parts	ft	increase
1	40	1.25

1 Add 50g for each hopper

Example 1

Charles E Romano Jr 2-17-05



(02/14/05)  
 Solution OC-02 2-210 PVA + Wcb-244  
 Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width:

Total %	Item #	Chemical Identification	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
29.12	10.00	-1- 2-210 Acac-PVA	26.21	2.912	72.68%	29.12	654.14	72.68	726.83
2.44	39.70	-1- <del>WCB-244</del>	1.47	0.970	24.22%	2.44	36.78	24.22	61.00
167.19	0.00	-2- Water	167.19	0.000	0.00%	167.19	4172.86	0.00	4172.86
0.96	10.00	-3- APG 325N	0.86	0.096	2.40%	0.96	21.59	2.40	23.99
0.28	10.00	-3- 01in 10G	0.25	0.028	0.70%	0.28	6.32	0.70	7.03
200.00			195.99	4.01	100.0%	200.00	4891.69	100.00	4991.69

Example 2

The calculated dry weight of the batch is: 4.01 g  
 ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005  
 The calculated solids of this batch is: 2.00%  
 ENTER THE DRY COVERAGE: 0.100 grams per ft2  
 The calculated yield of this batch is: 40.07 ft<sup>2</sup>  
 COATED FOOTAGE: 50.00  
 TOTAL SOLUTION NEEDED: 190.39  
 Add 50g for each hopper

parts	ft	increase
1	40	1.25

Charles E. Romano Jr 2-17-05







+-----+  
 Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width:

(02/14/05)  
 Solution OC-04 2-210 PVA + Morcryl 132

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
29.06	10.00	-1-	2-210 Acac-PVA	26.16	2.906	72.68%	29.06	654.14	72.68	726.82
3.23	30.00	-1-	Morcryl 132	2.26	0.968	24.21%	3.23	56.50	24.21	80.71
166.47	0.00	-2-	Water	166.47	0.000	0.00%	166.47	4162.95	0.00	4162.95
0.96	10.00	-3-	APG 325N	0.87	0.096	2.40%	0.96	21.64	2.40	24.04
0.28	10.00	-3-	01in 10G	0.25	0.028	0.70%	0.28	6.31	0.70	7.01
200.00				196.00	4.00	100.0%	200.00	4901.53	100.00	5001.53

The calculated dry weight of the batch is: 4.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 39.99 ft²

COATED FOOTAGE: 50.00

TOTAL SOLUTION NEEDED: 190.67

Add 50g for each hopper

parts	ft	increase
1	40	1.25

Example 4

Charles E. Brown - 02-17-05



Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width: 5.00 inches

Solution OC-05 HEC QP-300

(02/14/05)

Total	%	Item	Chemical	Wet	Dry	% of dry	Total	Wet	Dry	Total
Weight	Solids	#	Identification	Weight	Weight		Weight	mg/ft2	mg/ft2	mg/ft2
136.65	2.84	-1-	HEC QP-300	132.77	3.881	96.90%	136.65	3315.01	96.90	3411.91
62.11	0.00	-2-	Water	62.11	0.000	0.00%	62.11	1550.87	0.00	1550.87
0.96	10.00	-3-	APG 325N	0.87	0.096	2.40%	0.96	21.61	2.40	24.01
0.28	10.00	-3-	01in 10G	0.25	0.028	0.70%	0.28	6.30	0.70	7.00
200.00				196.00	4.00	100.0%	200.00	4893.80	100.00	4993.80

=====

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated dry weight of the batch is: 4.00 g

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated solids of this batch is: 2.00%

COATED FOOTAGE: 50.00'

The calculated yield of this batch is: 40.05 ft²

TOTAL SOLUTION NEEDED: 190.45

Add 50g for each hopper

parts	ft	increase
1	40	1.25

Control Example 1

PD. D. E R. 1



+-----+  
 (02/14/05)  
 Solution OC-6 K-100LV  
 Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
32.90	132.90	2.91	-1- K100LV	129.04	3.868	96.90%	132.90	3232.92	96.90	3329.81
65.86	65.86	0.00	-2- Water	65.86	0.000	0.00%	65.86	1650.02	0.00	1650.02
0.96	0.96	10.00	-3- APG 325N	0.86	0.096	2.40%	0.96	21.62	2.40	24.02
0.28	0.28	10.00	-3- Olin 10G	0.25	0.028	0.70%	0.28	6.30	0.70	7.01
200.00				196.01	3.99	100.0%	200.00	4910.86	100.00	5010.86

The calculated dry weight of the batch is: 3.99 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 39.91 ft²

COATED FOOTAGE: 50.00

TOTAL SOLUTION NEEDED: 190.93

parts	ft	increase
1	40	1.25

Add 50g for each hopper

Control Example 2

Charles E Romano Jr 2-17-05



Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

(02/14/05)

Solution OC-07 A15LV

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
165.90	2.34	-1-	A15LV	162.02	3.882	96.90%	165.90	4044.09	96.90	4140.99
32.86	0.00	-2-	Water	32.86	0.000	0.00%	32.86	820.20	0.00	820.20
0.96	10.00	-3-	APG 325N	0.87	0.096	2.40%	0.96	21.61	2.40	24.01
0.28	10.00	-3-	01in 10G	0.25	0.028	0.70%	0.28	6.30	0.70	7.00
0.28	200.00			195.99	4.01	1.00	200.00	4892.20	100.00	4992.20

Control Example 3

The calculated dry weight of the batch is: 4.01 'g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 40.06 ft<sup>2</sup>

COATED FOOTAGE: 50.00

TOTAL SOLUTION NEEDED: 190.41

1 Add 50g for each hopper

parts	ft	increase
1	40	1.25

Charles Romano & 2-17-05



Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width: 5.00 inches

(02/14/05)  
Solution OC-08 Carbose LT-30

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
12.44	31.20	-1-	Carbose LT-30	8.56	3.880	96.90%	12.44	213.69	96.90	310.59
186.33	0.00	-2-	Water	186.33	0.000	0.00%	186.33	4653.86	0.00	4653.86
0.96	10.00	-3-	APG 325N	0.86	0.096	2.40%	0.96	21.57	2.40	23.97
0.28	10.00	-3-	01in 10G	0.25	0.028	0.70%	0.28	6.29	0.70	6.99
200.00				196.00	4.00	100.0%	200.00	4895.41	100.00	4995.41

The calculated dry weight of the batch is: 4.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 40.04 ft<sup>2</sup>

COATED FOOTAGE: 50.00

TOTAL SOLUTION NEEDED: 190.50

1 Add 50g for each hopper

parts	ft	increase
1	40	1.25

Control Example 4

Charles E Romano Jr, 2-17-05











Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

Solution OC-11 Z-320 Acetoacetylated PVA

Total %	Item #	Chemical Identification	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
30.01	10.00	-1- Z-320 Acac-PVA	27.01	3.001	100.00%	30.01	900.00	100.00	1000.00
119.99	0.00	-2- Water	119.99	0.000	0.00%	119.99	3998.97	0.00	3998.97
0.00	10.00	-3- APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3- Olm 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
150.00			147.00	3.00	100.0%	150.00	4898.97	100.00	4998.97

The calculated dry weight of the batch is: 3.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 30.01 ft<sup>2</sup>

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.45

parts	ft	increase
1	30	1.25

Add 50g for each hopper

Example 5

Charles E. Romano 2-17-05



Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

(02/14/05)  
 Solution OC-12 Z-210 PVA + Wcb-244

22.45	22.45	10.00	-1-	Z-210 Acac-PVA	20.20	2.245	75.00%	22.45	674.96	75.00	749.95
1.89	1.89	39.70	-1-	Wcb-244	1.14	0.748	25.00%	1.89	37.98	25.00	62.98
125.67	125.67	0.00	-2-	Water	125.67	0.000	0.00%	125.67	4198.13	0.00	4198.13
0.00	0.00	10.00	-3-	APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	0.00	10.00	-3-	01in 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
150.00	150.00				147.01	2.99	100.0%	150.00	4911.06	100.00	5011.06

The calculated dry weight of the batch is: 2.99 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 29.93 ft2

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.70

parts	ft	increase
1	30	1.25

1 Add 50g for each hopper

Example 6

Charles Romano 2-17-05







+-----+  
 Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

(02/14/05)

Solution OC-14 Z-210 PVA + Morcryl 132

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
22.54	10.00	-1-	2-210 Acac-PVA	20.29	2.254	75.00%	22.54	675.00	75.00	750.00
2.50	30.00	-1-	Morcryl 132	1.75	0.751	25.00%	2.50	58.33	25.00	83.33
124.96	0.00	-2-	Water	124.96	0.000	0.00%	124.96	4157.89	0.00	4157.89
0.00	10.00	-3-	APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3-	01in 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
150.00				146.99	3.01	100.0%	150.00	4891.23	100.00	4991.23

=====  
 The calculated dry weight of the batch is: 3.01 g  
 ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005  
 The calculated solids of this batch is: 2.00%

Example 8

ENTER THE DRY COVERAGE: 0.100 grams per ft2  
 The calculated yield of this batch is: 30.05 ft²

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.28

parts	ft	increase
1	30	1.25

Add 50g for each hopper  
 =====

Charles E Pennano Jr 2-17-05



Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

(02/14/05)  
 Solution OC-15 HEC QP-300

Total %	Item #	Chemical Identification	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
105.86	2.84	-1- HEC QP-300	102.85	3.006	100.00%	105.86	3421.13	100.00	3521.13
44.14	0.00	-2- Water	44.14	0.000	0.00%	44.14	1468.20	0.00	1468.20
0.00	10.00	-3- APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3- Olin 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00

150.00	146.99	3.01	100.0%	150.00	4889.33	100.00	4989.33
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The calculated dry weight of the batch is: 3.01 g

Condred Example 7

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 30.06 ft²

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.24

parts	ft	increase
1	30	1.25

1 Add 50g for each hopper

Charles E Romano Jr 2-17-05



++++++ Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

Solution OC-16 K-100LV

Total Weight	% Solids	Item #	Chemical Identification	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
103.34	2.91	-1-	K100LV	100.34	3.007	100.00%	103.34	3336.43	100.00	3436.43
46.66	0.00	-2-	Water	46.66	0.000	0.00%	46.66	1551.39	0.00	1551.39
0.00	10.00	-3-	APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3-	Oiln 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
150.00				146.99	3.01	100.0%	150.00	4887.81	100.00	4987.81

03.34 •  
 16.66

=====  
 The calculated dry weight of the batch is: 3.01 g  
 ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005  
 The calculated solids of this batch is: 2.00%

Control Example 8

ENTER THE DRY COVERAGE: 0.100 grams per ft2  
 The calculated yield of this batch is: 30.07 ft²  
 COATED FOOTAGE: 50.00

DAYS	ft	increase
1	40	1.25

TOTAL SOLUTION NEEDED: 190.28  
 1 Add 50g for each hopper fill

Charles E. Plummer Jr.  
 2-17-05



Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches

(02/14/05)

Solution OC-17 A15LV

Total	%	Item	Chemical	Wet	Dry	% of dry	Total	Wet	Dry	Total
Weight	Solids	#	Identification	Weight	Weight		Weight	mg/ft2	mg/ft2	mg/ft2
128.34	2.34	-1-	A15LV	125.34	3.003	100.00%	128.34	4173.50	100.00	4273.50
21.66	0.00	-2-	Water	21.66	0.000	0.00%	21.66	721.27	0.00	721.27
0.00	10.00	-3-	APC 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3-	01in 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00

150.00	147.00	3.00	1.00	150.00	4894.78	100.00	4994.78
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The calculated dry weight of the batch is: 3.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 30.03 ft²

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.36

parts	ft	increase
1	30	1.25

1 Add 50g for each hopper

Condza 1 Example 9

Charles E Roman & 2-17-05



\*\*\*\*\*

Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width: 5.00 inches

(02/14/05)  
Solution OC-18 Carbose LT-30

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
9.59	31.20	-1-	Carbose LT-30	6.60	2.993	100.00%	9.59	220.51	100.00	320.51
140.41	0.00	-2-	Water	140.41	0.000	0.00%	140.41	4691.05	0.00	4691.05
0.00	10.00	-3-	APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	10.00	-3-	Oiln 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00

150.00	147.01	2.99	100.0%	150.00	4911.56	100.00	5011.56
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The calculated dry weight of the batch is: 2.99 g

Control Example 10

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 29.93 ft<sup>2</sup>

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.71

parts	ft	increase
1	30	1.25

1 Add 50g for each hopper

Charles E Romano Jr 2-17-05



\*\*\*\*\*

Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width: 5.00 inches

(02/14/05)  
Solution OC-19 GH-23 PVA

Total	%	Item	Chemical	Weight	Dry	% of dry	Total	Wet	Dry	Total
Weight	Solids	#	Identification	Weight	Weight		Weight	mg/ft2	mg/ft2	mg/ft2
<del>28.25</del>	<del>10.00</del>	<del>-1-</del>	<del>GH-23 PVA</del>	<del>26.96</del>	<del>2.995</del>	<del>100.00%</del>	<del>29.95</del>	<del>900.00</del>	<del>100.00</del>	<del>1000.00</del>
<del>29.95</del>	<del>10.00</del>	<del>-2-</del>	<del>Water</del>	<del>120.05</del>	<del>0.000</del>	<del>0.00%</del>	<del>120.05</del>	<del>4007.57</del>	<del>0.00</del>	<del>4007.57</del>
<del>120.05</del>	<del>0.00</del>	<del>-3-</del>	<del>APG 325N</del>	<del>0.00</del>	<del>0.000</del>	<del>0.00%</del>	<del>0.00</del>	<del>0.00</del>	<del>0.00</del>	<del>0.00</del>
53.4	10.00	-3-	01in 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
150.00				147.00	3.00	100.0%	150.00	4907.57	100.00	5007.57

\*\*\*\*\*

The calculated dry weight of the batch is: 3.00 g

Cardzel Example 11

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 29.95 ft<sup>2</sup>

COATED FOOTAGE: 37.50

parts	ft	increase
1	30	1.25

TOTAL SOLUTION NEEDED: 155.63 Add 50g for each hopper

\*\*\*\*\*

Charles E. Romano Jr 2-17-05



for Feb 18 SCS

(02/14/05)

Solution OC-20 WO-320 PVA

Support Type: 4.50 inches  
Coated Width: 5.00 inches  
Support Width:

Total %	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
46.17	-1-	WO-320 PVA	43.17	3.001	100.00%	46.17	1438.46	100.00	1538.46
103.83	-2-	Water	103.83	0.000	0.00%	103.83	3459.65	0.00	3459.65
0.00	-3-	APG 325N	0.00	0.000	0.00%	0.00	0.00	0.00	0.00
0.00	-3-	01in 10G	0.00	0.000	0.00%	0.00	0.00	0.00	0.00

150.00

147.00 3.00

100.0%

150.00

4898.11

100.00

4998.11

The calculated dry weight of the batch is: 3.00 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 2.00%

ENTER THE DRY COVERAGE: 0.100 grams per ft2

The calculated yield of this batch is: 30.01 ft<sup>2</sup>

COATED FOOTAGE: 37.50

TOTAL SOLUTION NEEDED: 155.43

parts	ft	increase
1	30	1.25

1 Add 50g for each hopper

Control Example 12

Charles E. Fennell 2-17-05



Bottle 2

Support Type: (1) Gel 7869  
 Coated Width: 4.50 inches (2) DI  
 Support Width: 5.00 inches (3) 5-100 matte

Solution BL-01 Succinylated Gelatin

Solution BL-01 Succinylated Gelatin									
Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2
298.28	90.00	-1-	K&K Gel 7869	29.83	268.452	99.40%	298.28	110.44	993.97
2397.65	0.00	-2-	Water	2397.65	0.000	0.00%	2397.65	8877.55	0.00
4.07	40.00	-3-	5-100 matte be	2.44	1.628	0.60%	4.07	9.04	6.03
2700.00				2429.92	270.08	100.0%	2700.00	8997.04	1000.00
=====									
The calculated dry weight of the batch is: 270.08 g									
ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005									
The calculated solids of this batch is: 10.00%									
ENTER THE DRY COVERAGE: 1.000 grams per ft2									
The calculated yield of this batch is: 270.08 ft2									
COATED FOOTAGE: 500.00									
TOTAL SOLUTION NEEDED: 2861.67									

PARTS	ft	increase
1	400	1.25

1 Add 50g for each hopper

298.28  
 2397.65  
 4.07



Support Type:  
Coated Width: 4.50 inches  
Support Width: 5.00 inches

(02/14/05)

Solution IL-01 Elv 52-22 + Wcb-232

Total	%	Item	Chemical	Wet	Dry	% of dry	Total	Wet	Dry	Total
Weight	Solids	#	Identification	Weight	Weight		Weight	mg/ft2	mg/ft2	mg/ft2
564.64	9.54	-1-	Elv 52-22	510.77	53.867	77.00%	564.64	1095.12	115.49	1210.61
53.65	30.00	-2-	Wcb-232	37.55	16.095	23.00%	53.65	80.52	34.51	115.02
781.71	0.00	-3-	Water	781.71	0.000	0.00%	781.71	1676.02	0.00	1676.02
1400.00				1330.04	69.96	100.0%	1400.00	2851.66	150.00	3001.66

The calculated dry weight of the batch is: 69.96 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 5.00%

ENTER THE DRY COVERAGE: 0.150 grams per ft2

The calculated yield of this batch is: 466.41 ft<sup>2</sup>

COATED FOOTAGE: 750.00

TOTAL SOLUTION NEEDED: 1316.32

1 Add 50g for each hopper

parts	ft	increase
1	600	1.25

Charles E Romano Jr 2-17-05



+-----+  
 Support Type: 4.50 inches  
 Coated Width: 5.00 inches  
 Support Width: 5.00 inches  
 (02/14/05)

Solution IL-01 ELV 52-22 + Wcb-232

Total	%	Item	Chemical	Wet Weight	Dry Weight	% of dry	Total Weight	Wet mg/ft2	Dry mg/ft2	Total mg/ft2
Weight Solids	#	Identification								
564.64	9.54	-1-	ELV 52-22	510.77	53.867	77.00%	564.64	1095.12	115.49	1210.61
53.65	30.00	-2-	Wcb-232	37.55	16.095	23.00%	53.65	80.52	34.51	115.02
781.71	0.00	-3-	Water	781.71	0.000	0.00%	781.71	1676.02	0.00	1676.02

1400.00	1330.04	69.96	100.0%	1400.00	2851.66	150.00	3001.66
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The calculated dry weight of the batch is: 69.96 g

ENTER SPECIFIC GRAVITY OF THE SOLUTION-> 1.005

The calculated solids of this batch is: 5.00%

ENTER THE DRY COVERAGE: 0.150 grams per ft2

The calculated yield of this batch is: 466.41 ft²

COATED FOOTAGE: 750.00

parts	ft	Increase
1	600	1.25

TOTAL SOLUTION NEEDED: 1316.32 1 Add 50g for each hopper fill

on n c B... 1 0-17-00



# 10% PVA Stock Solutions

Feb 16, 2005

1000 gm (100gm solid)

Z320 PVA

✓ 103.52g 96.6% Z320, lot 46902

✓ ↓ 896.48g DI water

1000g  $\Delta$

24 Sept 2004 data sh

1000g Z210 PVA

✓ 104.38g Z210, lot

✓ ↓ 895.62g DI water

1000g  $\Delta$

43903

24 Sept 2004  
data sh

Charles E Romano Jr 2-17-05  
Karen E Maskeasy 2-17-05



# Attachment D-3

SC5-4254										Originator		C Romano/ K Maskasky		Support: RC Paper F-surface CDT	
Conditions		DB	DP	Pres	Fi	UserID		L125610 / L594389		Date: 02/18/05					
Setting Sect.		44	30	0.3	39	Phone		x23004 / x77880		Coated by:					
Dryer No. Short		140	20	1	32	Pager		x50938							
Dryer No. 2		100	50	2	38	Prob. #		annual chg # has been provided							
Part ID	Slide 1 Melt #	Slide 2 Melt #	Slide 3 Melt #	% solids	mV n2	1/2 Pumps BL=#1 PUMP	Ctg. Spd. R/min	Coating Description		Laydown (mg/n2)	Linear Feet	Notes	Part ID		
1			OC-01	2.0%	5.0	101.0	18	Z-320 PVA + Surfactants		100			1		
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 1			
				10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850					
		BL-01		10.0%	8.5	85.8	18	w 2 44 / Z-210 PVA + Surfactants		100					
2			OC-02	2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 2	2		
		IL-01		5.0%	3.0	60.6	18	7869 Succinylated Pigskin Gelatin		850					
				10.0%	8.5	85.8	18	Z-210 PVA / W253 + Surfactants		100					
		BL-01		2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 3			
3			OC-03	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850			3		
		IL-01		5.0%	3.0	60.6	18	Z-210 PVA/Morceryl 132 + Surfactants		100					
				10.0%	8.5	85.8	18	Eliv 52-22 / W232 (77/23)		150	25	Example 4	4		
		BL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850					
5			OC-05	2.0%	5.0	101.0	18	HEC Qp300 + Surfactants		100					
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 1			
				10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			5		
		BL-01		2.0%	5.0	101.0	18	K100LV + Surfactants		100					
6			OC-06	2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 2	6		
		IL-01		5.0%	3.0	60.6	18	7869 Succinylated Pigskin Gelatin		850					
				10.0%	8.5	85.8	18	A15 LV + Surfactants		100					
		BL-01		2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 3			
7			OC-07	2.0%	5.0	101.0	18	Carbosh LT-30 + Surfactants		100			7		
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 4			
				10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850					
		BL-01		2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 5			
8			OC-08	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850			8		
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 6			
				10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850					
		BL-01		2.0%	5.0	101.0	18	Eliv 52-22 / W232 (77/23)		150	25	Example 7			

Charles E. Romano D. 2-17-05



SC5-4254										Originator		C Romano/ K Maskasky										Support: RC Paper F-surface CDT	
Conditions		DB	DP	Pres	Ft	UserID		L125610 / L594389		Date: 02/18/05													
Setting Sect.		44	30	0.3	39	Phone		x23004 / x77880		Coated by:													
Dryer No. Short		140	20	1	32	Pager		x50938															
Dryer No. 2		100	50	2	38	Prob. #		annual chg # has been provided															
Part ID	Slide 1 Melt #	Slide 2 Melt #	Slide 3 Melt #	% solids	ml/ h2	1/2 Pumps BL=ml PUMP	Crg. Spd. ft/min	Coating Description		Laydown (mg/h2)	Linear Feet	Notes	Part ID										
9			OC-09	2.0%	5.0	101.0	18	GH-23 + surfactants		100		Control	9										
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 5											
10	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			10										
			OC-10	2.0%	5.0	101.0	18	WO-320 + Surfactants		100		Control											
11			OC-11	2.0%	5.0	101.0	18	Z-320 PVA (no surfactant)		100			11										
		IL-01		5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 5											
12	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			12										
			OC-12	2.0%	5.0	101.0	18	W232 / Z-210 PVA (no Surfactant)		100													
13				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 6	13										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
14	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			14										
			OC-13	2.0%	5.0	101.0	18	Z-210 PVA / W253 (no surfactant)		100													
15				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 7	15										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
16	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			16										
			OC-14	2.0%	5.0	101.0	18	HEC Qp300 (no surfactant)		100		Control											
17				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 8	17										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
18	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			18										
			OC-15	2.0%	5.0	101.0	18	K100LV (no surfactant)		100		Control											
19				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 9	19										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
20	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			20										
			OC-16	2.0%	5.0	101.0	18	A15 LV (no surfactant)		100		Control											
21				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 10	21										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
22	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			22										
			OC-17	2.0%	5.0	101.0	18	Carboso LT-30 (no surfactant)		100		Control											
23				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 11	23										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
24	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			24										
			OC-18	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
25				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 12	25										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
26	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			26										
			OC-19	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
27				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 13	27										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
28	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			28										
			OC-20	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
29				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 14	29										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
30	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			30										
			OC-21	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
31				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 15	31										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
32	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			32										
			OC-22	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
33				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 16	33										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
34	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			34										
			OC-23	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
35				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 17	35										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
36	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			36										
			OC-24	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
37				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 18	37										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
38	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			38										
			OC-25	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
39				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 19	39										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
40	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			40										
			OC-26	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
41				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 20	41										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
42	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			42										
			OC-27	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
43				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 21	43										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
44	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			44										
			OC-28	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
45				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 22	45										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
46	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			46										
			OC-29	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
47				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 23	47										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
48	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			48										
			OC-30	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
49				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 24	49										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
50	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			50										
			OC-31	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
51				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 25	51										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
52	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			52										
			OC-32	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
53				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 26	53										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
54	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			54										
			OC-33	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
55				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 27	55										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
56	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			56										
			OC-34	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
57				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 28	57										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
58	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			58										
			OC-35	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
59				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 29	59										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
60	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			60										
			OC-36	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
61				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 30	61										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
62	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			62										
			OC-37	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
63				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 31	63										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
64	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			64										
			OC-38	2.0%	5.0	101.0	18	7869 Succinylated Pigskin Gelatin		850													
65				5.0%	3.0	60.6	18	Eliv 52-22 / W232 (77/23)		150	25	Example 32	65										
		IL-01		10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850													
66	BL-01			10.0%	8.5	85.8	18	7869 Succinylated Pigskin Gelatin		850			66										
			OC-39	2.0%	5.0	101.0	18																









### DESCRIPTION

Morcryl 132 and Morcryl 134 are two solution versions of Morez 101, a mid range molecular weight, solid grade, styrene/acrylic resin. Morcryl 132 is an economical, alcohol-free version while Morcryl 134 is a higher solids alternative. Both of these ammonia solubilized products offer excellent pigment wetting characteristics as a grinding vehicle and can function as a gloss, block and rheological modifier.

### CHARACTERISTICS

- Ready to use solution
- Excellent pigment wetting
- Good viscosity stability in high pigment load bases
- Excellent rheological modifier for water-based inks and overprints
- Excellent hold-out and printability with good rewet
- Excellent block modifier
- Can be cross-linked with zinc or zirconium
- Low odor

### COMPATIBILITY WITH OTHER POLYMERS

Morcryl 132 and 134 are compatible with the standard styrene/acrylics that are used in the graphic arts industry.

### Typical Properties

	Morcryl 132	Morcryl 134
Appearance	Clear to slight yellow solution	Clear to slight yellow solution
Solids, %	32	34
pH	7.9 - 8.9	8.0 - 9.0
Viscosity, cP	1500	2000
T <sub>g</sub> , °C	100	100
Acid number	205	205
Molecular weight	6500	6500
Flash point, °F	> 200	110
Freeze/thaw stability	Yes	Yes
VOC, %	1.3	5.4

### Composition

	132	134
Morez 101	32.0	34.0
Water	62.0	53.0
Ammonia	6.0	8.0
Isopropanol		5.0

### Solvent Compatibility with Morcryl 134

Solvent	% Addition of Solvent		
	10%	20%	30%
Isopropanol	24" - 3Z	29" - 2Z	21" - 2Z
Ethanol	27" - 3Z	29" - 2Z	20" - 2Z
n-Propanol	20" - 3Z	27" - 2Z	20" - 2Z
Ethyl Acetate	18" - 3Z	38" - 2Z	27" - 2Z
MEK	16" - 3Z	26" - 2Z	22" - 2Z
Propylene Glycol	44" - 3Z	19" - 3Z	40" - 2Z
Ektasolve DB	28" - 3Z	42" - 2Z	30" - 2Z



10/068,824

**Application: Base Grinds with Morcryn 132 and Morcryn 134**

	A	A1	B	B1	C	C1	D	D1	E	E1
	Yellow		Yellow		Blue		Blue		Black	
Presscake*	35.0	35.0	30.0	30.0	35.0	35.0	40.0	40.0	25.0	25.0
Morcryn 132	39.0	-	40.0	-	22.0	-	35.0	-	39.5	-
Morcryn 134	-	36.7	-	37.6	-	20.7	-	32.9	-	36.7
Water	25.5	27.8	29.5	31.9	42.5	43.8	24.5	26.6	35.0	37.8
Defoamer	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Pigment/Binder ratio	2.8/1	2.8/1	2.3/1	2.3/1	5/1	5/1	3.6/1	3.6/1	2/1	2/1

## \*Presscake Pigments

A - Diarylide 274-1744 (Sun)

B - AAOT 1270 (Hercules)

C - Sunfast Blue 249-1282 (Sun)

D - Sunbrite Red 210 235-0552 (Sun)

E - Eftex 8 (Cabot), Panther 39 (Huber), Raven 1060 (Columbian)

**Application: Overprint Formulation for Water, Grease Resistance**

Lucidene® 602	37.0
Lucidene 605	28.0
Morcryn 132	20.0
Luciwax 37	5.0
15% Zinc Oxide Solution <sup>1</sup>	2.0
Water	8.0
Total	100.0
Viscosity, #2 Zahn cup, sec.	32

**Application: Overprint Formulation for Wet Offset**

Premix:	
Water	5.0
Luciwax® 37	3.0
Add with Stirring in Order:	
Morcryn 132	25.0
Lucidene 374	63.5
Aerosol OT-75 <sup>2</sup>	3.5
Total	100.0
Viscosity, #3 Zahn cup, sec.	25

<sup>2</sup>Cytec Industries

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October 2002

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Charles E. Romano

INK RECORDING ELEMENT

Serial No. 10/068,824

Filed 06 February 2002

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA. 22313-1450

Group Art Unit: 1774

Examiner: Pamela R. Schwartz

I hereby certify that this correspondence is being deposited today with the United States Postal Service as first class mail in an envelope addressed to Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

*Christine Tolhurst*  
Christine Tolhurst

*February 28, 2005*  
Date

**SECOND DECLARATION UNDER RULE 132**

1. I, Charles E. Romano, Jr., state that I am a resident and citizen of the United States. I obtained a Bachelor of Science degree in Chemistry from LeMoyne College in Syracuse, New York in 1982. I have been an employee of Eastman Kodak Company (hereinafter referred to as Kodak) since May of 1985. I have been assigned to work in product development and research of imaging processes, including areas relating to inkjet inks and inkjet elements.
2. I am one of the co-inventors of U.S. Serial No. US 10/068,824.
3. I prepared and coated the Examples described in the present Application in 2001. Copies of the original documentation relating to these Examples has been provided as Attachments C-1 to C-4.
4. I have prepared and coated a new set of experiments in January – February, 2005, duplicating the original experiments. These are included as Examples 1-4 and Control Examples 1-6 in Attachments D-1 to D-3.



5. A comparison of layer/melt composition OC-01 and OC-09 indicate that the overcoat layer compositions are identical, with the exception that a non-derivatized poly(vinyl alcohol) is used in the control, Control Example 5, while a derivatized poly(vinyl alcohol) is utilized in the inventive sample, Example 1.
6. As previously stated, the surfactants used in the overcoat layer of Example 1 were added as coating aids, without which repellencies would occur in manufacturing, resulting in an unacceptable coating.
7. As can be seen from Examples 1-4 in Attachment D-1, coated with surfactant, improvements in laminate adhesion are achieved over Control Examples 1-6, coated with surfactant, as are achieved by Examples 5-8 in Attachment D-1, coated without surfactant, over Control Examples 7-12, coated without surfactant. The presence or absence of surfactant affects the coating quality, not the laminate adhesion improvement.
8. Copies of the original documentation relating to these new Examples has been provided as Attachments D-1 to D-3.
9. I further declare that all statements made herein of my own knowledge are true and that the statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent resulting therefrom.

Date: 2-28-05

Charles E. Romano Jr.  
Charles E. Romano, Jr.



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